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MEETING OF APRIL 26, 1922.

SUBJECT OF THE EVENING: ENDOCRINE THERAPY.

A Critical Consideration of Endocrine Therapy.

By W. B. Cannon, M.D., Boston.

Noel Paton entitled his little book on the endocrine glands "The Regulators of Metabolism." But these glands have other functions than that; they regulate growth, they determine the development of intelligence; they fix the appearance of the secondary sexual characteristics and the regular sequences in reproduction, and they control the nature and rate of the chemical changes which take place in the body. There is no question of the importance of these glands and of their capacity to cause very profound disturbances in all the above-mentioned processes. It is only fair to ourselves, however, and to a satisfactory development of the knowledge of the functions of these glands, that we recognize the present limitations of our ability to control these "controllers" and see clearly the dangers of using careless methods and of making hasty inferences.

In justification of these strictures it may be said, first of all, that we lack reliable clinical tests of the defective functioning of the endocrine glands. We have a good clinical test for the over-functioning of the thyroid gland,—the increased metabolism. This increase in cases of "hyperthyroidism" is not paralleled by any other pathological state. But we have no similarly trustworthy way of judging the operations of other glands. It is very common to attribute low blood pressure to hypoadrenalism, and to attribute high blood pressure to hyperadrenalism. There is no evidence whatever that the blood pressure is maintained by the secretion of adrenalin. In many different kinds of animals a small amount of adrenalin causes a fall of blood pressure rather than a rise. Furthermore, it has been shown that an amount of adrenalin which is necessary to induce a rise of blood pressure will stop the whole process of digestion. Dr. Aub has shown that after removal of the adrenal glands an animal may have no fall of blood pressure for two or three days. Stuart and Rogoff have removed one adrenal gland and severed the nerves to the other so that there was no secretion, and kept the animals thus operated upon in normal condition, for months. In the face of such evidence, to attribute a low blood pressure to absence of adrenal secretion is wholly unjustified. Similar remarks could be made about such conditions as adiposity or short stature in relation to these glands. These

conditions may be due to a variety of widely different causes. Furthermore, it is necessary to discriminate between what may be an immediate sequence of disturbance in the functioning of an endocrine gland and the results of secondary changes in other glands before we can decide what is the rational course to pursue.

We are largely ignorant of the ways in which agents are effective when they are administered. In literature which is widely distributed at the present time and in medical writings the giving of adrenalin by mouth is commonly advocated. There is clear evidence that relative to the physiological output enormous amounts of adrenalin can be given by mouth with no effect whatever. Either the substance is destroyed in the alimentary tract or it is absorbed so slowly that it has no influence. Recently it has been found that after an animal is deprived of the pancreas, the high blood sugar can be brought down sharply to normal by intravenous injections of an extract of the pancreas, but that the extract has no effect if given by mouth.

There is a danger in the misuse of endocrine products which is shared by all other therapeutic agents. For example, the misuse of adrenalin and pituitary extract in the treatment of shock. In a state of shock there is evidence that the individual is suffering from diminished blood volume, which fails to fill the circulatory system even though the blood vessels are greatly contracted. After the giving of pituitrin or adrenalin arterial pressure may be increased, but the circulation has not been improved in the essentially important capillary area. The action of these drugs is to constrict the arterioles. This dams up the blood in the arteries and, if anything, checks the circulation in the capillaries.

Certain fallacies ought to be borne in mind in dealing with these substances. They are frequently given in the belief that there is a deficiency of one gland or another. For example, because pituitrin will cause contraction of the uterus in labor it has been supposed that it is the natural function of the pituitary to stimulate the uterus during labor. That is a fallacy dependent upon the failure to recognize that pituitrin is a drug with a pharmacodynamic action. There is no evidence that pituitrin acts in the body as it does when given as a drug. We are not at all justified in drawing inferences from the therapeutic effect of a drug made from these glands as to their physiological rôle in the body.

A second fallacy is dependent on the use of polyglandular therapy. There is a tendency to believe that all the substances included in the mixture are effective. All the agents may get credit for a single one contained in the mixture. An analysis of a number of cases in which such a compounded preparation had been used with extraordinary effect showed that they could all be reasonably regarded as cases of hypothyroidism and that the thyroid substance in the mixture had wrought its usual changes in such conditions.

Another fallacy lies in the claim that there is a condition of the body known as "hormone hunger," that is, that when a gland is absent or deficient and a mixture of gland substances is given the body will take from the mixture what it needs and will neglect the rest. That is pure theory. It is not commonly true of therapeutic agencies. It is not true of thyroid substances, for example, for thyroid can be given until it produces a very distressing condition. The body does not neglect it, but suffers from it.

I believe as we make progress in our knowledge of endocrine therapy we shall get greater and greater control of the bodily processes. Most of the original progress in endocrinology was made by clinical observers. That fact deserves emphasis. The clinics receive varieties of disturbances that are very difficult to reproduce in the laboratory. What is needed for progress is not this confusing, misleading use of mixtures of all sorts, but a careful use of single agents, rationally chosen, so that when results are obtained they may be attributed to the agent used. My plea is for a critical attitude in the presence of the present wave of enthusiasm for endocrine interpretations of medical disorders and for endocrine treatment of all sorts of complaints. Throughout the history of medicine advance has been made by critical study and not by simple faith. Furthermore, silliness on the part of the credulous has a tendency to repel the more sober-minded, so that persons who are most needed for the development of new knowledge in endocrinology are not encouraged to undertake the task.

THE USE AND ABUSE OF THYROID.*

BY J. H. MEANS, M.D., BOSTON.

Although little enough is known of the function of any of the endocrine glands, I am inclined to believe perhaps that little is greater in the case of the thyroid than in that of any of the others. There are definite syndromes which we associate clinically with over or underactivity of the thyroid which can be closely paralleled artificially through thyroid feeding in the one case or thyroidectomy in the other. Furthermore, in the case of the thyroid a substance has been isolated in pure chemical form, which in many respects behaves as though it were the active principle, or perhaps better one of the active principles of the gland. This substance has been called thyroxin by its discoverer, Kendall.[1]

The functions of all the endocrine glands are unquestionably closely interrelated, but the manner of these interrelationships is very imperfectly understood. Many of the hypotheses

*Such original work of the author and his associates as is referred to in this paper has been aided in part by a gift from Dr. William Norton Bullard.

that have been elaborated concerning them rest upon a very scanty basis of fact. In general, it may probably be said with truth that all of the endocrine glands are in some way concerned in the two great processes of metabolism and growth, both of these terms being taken in their broadest sense.

The most conspicuous function of the thyroid, in so far as we know its functions, is its regulation of the rate of oxidation within the body, or of the rate of energy transformation in living cells. Other glands than the thyroid are concerned in this regulation, notably the adrenal, and to a less extent the pituitary, but less strikingly so than is the thyroid. Furthermore, the thyroid probably has other functions than the regulation of the thermogenesis, as shown, for example, by the work of Hunt,[2] who found that thyroid feeding decreased the susceptibility of animals to certain poisons.

In spite of these other functions, however, it is chiefly in its rôle of governor to the human engine, or, if you will, damper to the human furnace,* that the thyroid presents itself to the attention of the clinician. Overactivity of the thyroid is characteristically manifested by an increased rate of combustion within the body; underfunction by a decrease. A knowledge of this fundamental principle of thyroid activity enables us to understand the alterations of thyroid function seen clinically. The signs and symptoms of toxic goitre, for example, the flushed skin, the increased sweating, and the sensation of warmth, are the direct result of an increased heat elimination, while the increased circulation rate, the loss of body weight, and the compensatory appetite increase may be regarded as the direct result of increased heat production. Similarly, the cardinal manifestations of myxedema,—the lack of sweating, the chilliness, the sluggish circulation and the gain in weight,—may be explained on the basis of decreased heat production and elimination.

The purpose of the present paper is to discuss briefly the indications and contraindications for thyroid therapy. We cannot use a drug intelligently unless we know its pharmacologic action, nor can we intelligently treat disease unless we have some understandnig of the functional and structural pathology involved. In the case of thyroid therapy we are using as a drug a normal constituent of the body. We know something of the function of the gland as it exists in the body and of its action when given as a drug. We should, therefore, be in a good position to see when thyroid should be used therapeutically as well as when it should not.

Let us consider for a moment the effect of thyroid when given to a normal man. In Figure 1 is shown an experiment performed by my associates, Dr. W. G. Lennox and Miss H. W. Burgess. The ingestion of dried thyroid gland

*Neither of these analogies is strictly correct, but they have value suggestively.

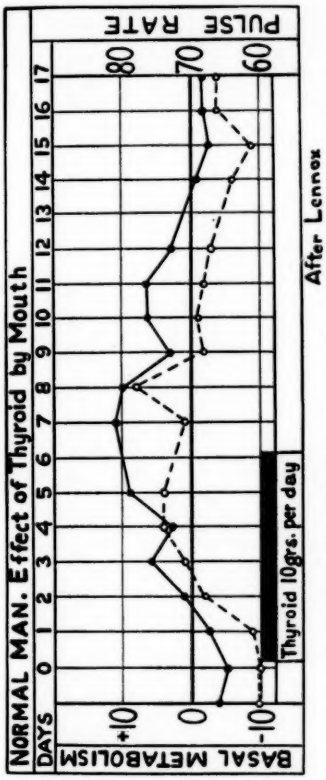

FIG. 1. Effect of thyroid on a normal man. The heavy black line denotes basal metabolism; the interrupted line, pulse.

for six days caused a gradual rise in the rate of metabolism and pulse and produced certain definite symptoms, such as palpitation. The chief point which I should like to emphasize is the relatively slow action of thyroid. The maximum rise in pulse and metabolism did not occur until the seventh day and the effect took some nine days more to wear off. This effect of thyroid on metabolism is similar in character to that of adrenalin. I hope that Dr. Aub will later tell us about the adrenal effect. The adrenal seems to be a rapid, the thyroid a slow action.

In contrast with the thyroid feeding curve are those obtained by Marine and Lenhart,[3] after complete thyroidectomy in rabbits. As we should expect, they show essentially the diametric opposite effect. A drop in metabolism of a similar order of magnitude has been observed by Aub and myself in a woman in whom Dr. Brewster did an extensive thyroidectomy for thyroiditis.[4]

These facts emphasize what is news to no one, that thyroid administration is indicated in hypothyroidism. The rapid relief of the symptoms of myxedema by the giving of thyroid gland is one of the great advances of modern medicine. But just because we have this highly potent agent at hand to cure certain pathologic states, just so much the more should we be on our mettle to diagnosticate them. Frank myxedema and cretinism should offer no difficulties, and yet I think many of us have seen typical cases of the former which had been regarded as nephritis for years. It is the atypical case of

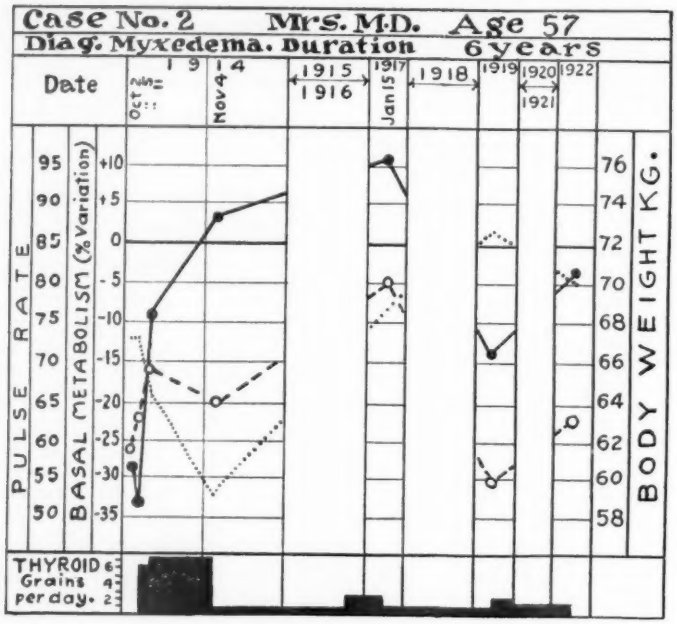

FIG. 2. Effect of thyroid in a case of myxedema. The heavy black line, in this and in Figure 3, denotes basal metabolism, the interrupted line pulse, and the dotted line body weight. The observations of Oct. 2 and 5, 1914, were before thyroid, the subsequent ones during the administration of thyroid. It will be seen that for the most part the dosage was so regulated that the metabolism stayed essentially within normal limits.

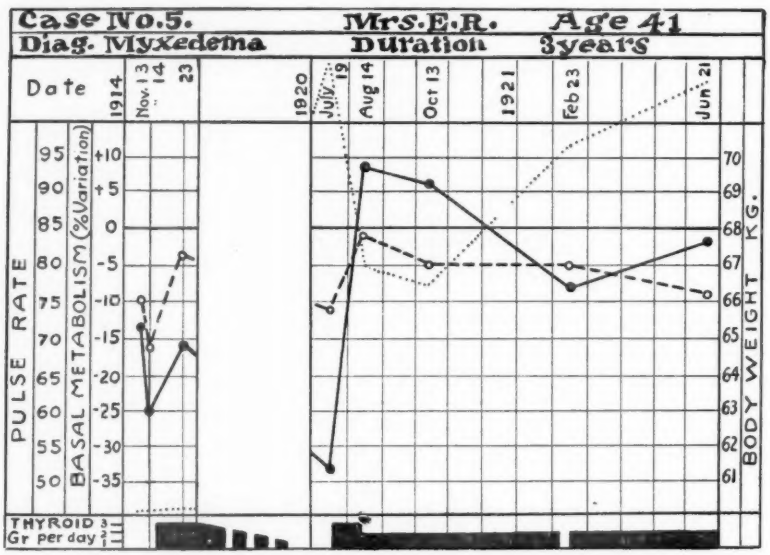

FIG. 3. Effect of thyroid in another case of myxedema. The observations of Nov. 13 and 14, 1914, were before thyroid, that of Nov. 23 after. The patient left the hospital in the middle of December, 1914, and was not seen again until July 14, 1920. She had taken thyroid for six months after leaving the hospital, and then very irregularly for a few months more. She had had none at all for a year previous to July 14, 1920. Her symptoms and signs of myxedema were more pronounced than ever. The second course of thyroid promptly brought her to a normal state and she has remained so ever since. One observation has been received since the above drawing was made. On Jan. 5, 1922, the metabolism was 5 per cent., the pulse 89, and the weight 73 kg. The dose of thyroid has remained the same.

hypothyroidism that will tax our diagnostic acumen. At present the clinical use of calorimetry offers a valuable aid in the recognition of these borderline cases.[5, 6] In the presence of symptoms suggestive though not typical of myxedema, the finding of a subnormal metabolic rate justifies the administration of thyroid gland, and in both the typical and atypical cases of hypothyroidism the further observation of the basal metabolism will provide a guide to the

proper dose of the drug for the given individual. As is shown by the charts of some of our myxedema patients (Figures 3 and 4), the aim should be to give sufficient thyroid to raise the metabolism to a normal level and keep it there, but not to give enough to produce hyperthyroidism.

In certain types of goitre there may be an indication for the administration of thyroid or thyroxin. Certainly not in exophthalmic goitre nor in adenoma with hyperthyroidism, for in these the body is already suffering from an excess of thyroid secretion, but in certain diffuse colloid goitres, as pointed out by Plummer,[7] there may be an actual deficiency of thyroid secretion available for the tissues. The goitre under such circumstances is the result, not the cause, of the hypothyroidism. In cases of this type, he has found, the administration of thyroxin will diminish the size of the gland and fails to produce the symptoms which thyroxin would in a normal person. These patients have basal metabolic rates of 8 per cent. to 15 per cent. below the average normal.

The next problem which presents itself is whether thyroid therapy is ever indicated in conditions which are not clearly those of hypothyroidism. In his textbook of pharmacology and therapeutics Dr. H. C. Wood, Jr.,[8] says: "The diseases in which the thyroid body has been given include nearly all the chronic and many of the acute troubles known to humanity; in some of them it has seemed of benefit. In most it has proved useless." We cannot even enumerate them here. The list includes such varied conditions as dysmenorrhoea, psoriasis, heart block and the non-union of fractures. In none of them has the result of thyroid therapy been so obviously good as to make the adoption of that form of therapy general.

By far the most important problem from the point of view of the practitioner is whether it is legitimate to use thyroid in the treatment of obesity. I have expressed the view in the past that it is not legitimate. My reasons were that, having found that in simple obesity there was no alteration of basal metabolism, I believed that no element of hypothyroidism existed, and that, therefore, the effect of giving thyroid would be to produce hyperthyroidism. It might be objected to this argument that thyroid does reduce weight and that a mild grade of hyperthyroidism if not long continued does no great harm. Perhaps this may be true in certain instances, but I have repeatedly seen patients, particularly those who are no longer young, in whom the use of thyroid has produced very definite circulatory symptoms, palpitation, precordial pain and sometimes even attacks suggesting angina pectoris, symptoms which to my mind cannot be regarded lightly. Furthermore, it is a matter of common experience that the weight-reducing power of thyroid in obesity is uncertain and oftentimes of short duration. A part is due merely to loss of water, for one effect of thyroid is the production of diureses.

I still feel that in the routine treatment of obesity thyroid is undesirable. I do not wish to give the impression that I am opposed to all empiric therapy. Many of the advances in medicine have been made through empiricism, but if one uses thyroid empirically he should do so with the greatest care. It is a very different matter to give thyroid to a patient under daily observation in a hospital, where pulse, weight, metabolism and symptomatology can be constantly observed, to ordering it for a patient not to be seen again for several weeks. The former may be legitimate where the latter is not.

For example, in the treatment of obesity I am permitted through the kindness of Dr. Edward H. Mason to refer to two cases treated by him in the Royal Victoria Hospital, Montreal. These patients, both women, were treated by a combination of extremely low diet, under 500 calories per day, and thyroid, the dose varying between three and fourteen grains per day. This programme was entirely legitimate under the circumstances, both patients being under close observation in a metabolism ward throughout their treatment, and the results obtained justified the methods used. The treatment lasted some fifteen weeks, during which time one patient lost 29, the other 36 kg. The basal metabolism, observed frequently, in one patient never went above +8.6 per cent., but in the other once rose to +21 per cent. The latter was, therefore, for a brief interval, rendered thyrotoxic, but it apparently did no harm.

The fact that Dr. Mason coupled his thyroid therapy with a diet just short of starvation is to my mind one of the most important features of his work. Benedict[9] has shown that the effect of prolonged undernutrition is to reduce the rate of metabolism, that of giving thyroid is to raise it. It may well be that patients on very low diets tolerate thyroid better than those on more liberal ones. It is not at all impossible that the lowered metabolism in starvation is a compensatory mechanism on the part of nature to reduce tissue loss to a minimum. If one did not wish to save tissue, but to burn it, one might accomplish it by starving and giving thyroid at the same time. One wonders, however, what would have happened in Dr. Mason's cases with the dietary restriction alone. In 1915 I reported observations on an obese woman who was reduced 10 kg. in 36 days by a system of intermittent fasting.[10] She lost weight, therefore, at about the same rate but without the use of thyroid.

Another important phase of thyroid therapy is the use of this drug by the laity. The profession, of course, is deluged with propaganda from unprincipled drug promoters telling of the nearly universal helpfulness of organotherapy. Let us hope that the majority of physicians will be duly skeptical. It would seem,

though, that enough are credulous to make the advertising profitable. It is, however, the direct self-dosing by the laity that is most fraught with danger. In certain instances the public is urged to take thyroid as a general prophylactic agent and cure-all. The use of thyroid without a physician's advice, in order to reduce weight, is quite common.

For example, a graduate nurse has kindly collected certain data for me regarding the use of thyroid by the pupils in a girls' boarding school in Massachusetts. The local druggist sold it over the counter to anyone wishing it. Such self-dosing was quite contrary to school rules, but was difficult to stop. The craze among the girls was to be thin and to have lithesome figures; the thyroid, it was hoped, would secure the fulfillment of this ambition. The histories of two girls were obtained in detail. Miss A., 17 years old, took ten grains a day for three weeks, when she began to feel weak, to have increased sweating, nausea and more or less headache. She took the thyroid because a kind relative told her it would make her thin. It apparently did so temporarily, for she lost twenty pounds, but it made her sick also. Miss B. took thyroid upon the advice of Miss A. She took ten grains a day for two weeks, then about eight grains a day for another week, after that took it irregularly, sometimes five grains, sometimes ten or twelve, extending over a period of five or six weeks. She lost seventeen pounds and also developed nausea, vomiting, headache, anorexia, loss of appetite, extreme nervousness and insomnia. Her pulse rose to 110. After the drug had been stopped the nervous condition persisted for several months, gradually clearing up.

CONCLUSIONS.

In conclusion it seems fair to say:

1.—That in thyroid we have a highly active drug. The conspicuous feature of its action is the increasing of the rate of combustion within the body and the production of the symptoms associated therewith.

2.—That certain clinical conditions exist in which a low metabolic rate is undoubtedly due to underactivity of the thyroid. That in such the administration of thyroid relieves all symptoms. That certain types of non-toxic goitre may be included in this group.

3.—That in conditions other than hypothyroidism no conclusive indications for the use of thyroid have yet been found.

4.—In normal persons the ingestion of thyroid produces unpleasant if not harmful symptoms. In obese persons it does the same. In simple obesity there probably is no element of hypothyroidism. The use of thyroid in the routine care of obesity would therefore be unwarranted. An exception may be made when thyroid therapy is coupled with partial starvation.

5.—Whenever thyroid is used in conditions other than hypothyroidism—in obesity, for example, or empirically in other conditions—it should be used with the greatest caution. The physician should have a full understanding of its action and of the harm it may do, and have his patient under careful observation, so that the drug may be stopped at once if ill effects arise.

6.—Self-dosing with thyroid by the laity is highly undesirable. The profession should do its utmost to discourage this practice.

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ADRENAL THERAPY.

BY C. H. LAWRENCE, M.D., BOSTON.

The scope of this paper allows only brief mention of certain uses of adrenal gland extract. More common uses to which adrenalin is put depend, not upon its general effect on the physiology, but upon its local action on certain structures. Its use in surgery and laryngology is well understood and need not be discussed here. Its effect in relieving bronchial spasm in asthma and the skin manifestations of protein sensitization has been clearly demonstrated.

When, however, attention is turned to the effect of adrenal secretion upon the body in general, and its usefulness as a therapeutic agent, the greatest obscurity and conflict of opinion is encountered. Clinical medical literature is crowded with articles claiming that a variety of conditions, from epilepsy to post-infectious debility, are due to malfunction of the adrenals, and can be cured by the administration of adrenalin or adrenal extract plus one or more other glandular derivatives. Laboratory workers reply that they are unable to substantiate these claims by means of animal experimentation, and the clinician replies that he is treating sick human beings, not experimental animals. Add to this situation the propaganda of various manufacturers, whose only purpose is to exploit glandular therapy in general, and the situation becomes nearly hopeless.

The only hope at all lies in the fact that slowly, through research, a little more is becoming known and a little less suspected concerning

the adrenal and other endocrine glands, and that here and there clinicians are doing scientific work upon the subject.

There are, however, certain important points on which clinician and laboratory worker differ. These I wish briefly to call to your attention. The first is the effect of adrenalin on blood pressure. It has been shown by animal experimentation that injection of andrenalin causes a rise in blood pressure. From this fact it has been argued that the secretion of the adrenals was the important factor in maintaining blood pressure in man, and as a corollary, that injections of adrenalin would be successful in combating the hypotension of shock.

In spite of the fact that the rise in pressure following administration of adrenalin is temporary, that it may be followed by a fall to a level lower than that which previously obtained, and that Stewart and Rogoff[1] have shown that the adrenalin output in shock is not essentially changed from normal, adrenalin was and still is used enthusiastically in many conditions in which hypotension is one of the abnormal findings. At present its use in such conditions is diminishing, as experience slowly teaches that the effect obtained is too transitory to materially benefit the patient.

Another point on which laboratory worker and clinician differ is the effect of giving extract of the whole adrenal gland by mouth. This form of treatment has been condemned as useless by the laboratory, since no typical adrenalin effect could be demonstrated on animals following the oral administration of that substance. Some clinicians have felt sure that cases of definite hyposecretion of the adrenals, if not due to tuberculosis of the glands, were benefited by oral administration of whole adrenal substance. Among others, Osborne[2] has recently reported such a case, and my own experience, though limited, agrees with his. The explanation lies, I believe, in Rogers'[3] recent work. From his experiments with extracts of whole adrenal gland given by mouth to animals he concludes that "certain derivatives of the entire adrenal gland produce physiological reactions which differ materially from those of commercial adrenalin." Stewart[4] says: "The experimental evidence has tended more and more to show that the cortex is the part of the adrenal indispensable for life."

It seems probable, therefore, that adrenal substance administered by mouth is of value in certain types of adrenal insufficiency. It remains to be determined exactly how it produces its beneficial effects and in what conditions it is useful. Its exhibition in every case showing low blood pressure is no more logical or successful than the use of the nitrites in every case of hypertension. The low pressure is in most instances evidence of general malnutrition or toxaemia in which the adrenals may share, but which they do not cause.

The great need at present is more careful study of cases of possible adrenal disease. The presence of hypotension and Sergent's white line[8] do not justify the use of adrenal therapy.

A careful inquiry into the history in cases of hypoadrenalism will usually bring to light a previous severe infection or abnormal nervous strain. Nervous irritability, insomnia, loss of appetite, constipation or diarrhoea, palpitation, dyspnoea, often attacks of abdominal pain, and, most important of all, lack of muscle strength and easy fatigability — some or all of these symptoms appear in the history of any patient whose adrenal function is insufficient. Physical examination will usually disclose pallor, actual muscular weakness and limited response to physical effort. Microscopic examination of the blood as a rule shows a secondary anaemia of moderate degree, with often a relative increase of the lymphocytes. Chemical examination of the blood, in my experience, shows an abnormally low sugar content. This has been previously reported by Falta,[5] Eppinger,[6] Bernstein,[7] and others, and is, I believe, of considerable diagnostic value. This estimation is available to any physician and should be made in all suspected cases. I also believe, though my experience with it is too limited to be of much value, that cholesterol estimations may prove important.

When a patient's history and physical examination present a picture similar to the one I have sketched, and when the laboratory findings fit into that picture, then, and only then, is adrenal therapy justified in the present state of our ignorance. We may eventually have an easier way of making the diagnosis, but it can come only as the result of painstaking study of patients, checked by research. There must be less use of glandular extracts in obscure cases simply because the picture is obscure and the action of the endocrines is likewise obscure. If it is ever to be anything else, there must be careful observation of cases in their early and curable stage. This cannot be done in hospitals, since patients do not often come to hospitals until the disease has passed that stage. But there can be close co-operation between practitioner and laboratory, which would make the results of research more available for the test of clinical use, and would lead the practicing physician to pay more heed to proven facts and less to inspired theories.

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PARATHYROID DEFICIENCY AND ITS TREATMENT.

BY FRANK H. LAHEY, M.D., BOSTON.

THE parathyroids were first described by Sandström, a Swedish anatomist, in 1880.

They were rediscovered by Gley in 1891, and his conception of their function maintained itself for approximately the succeeding ten years, namely, that it was the function of the parathyroids, by differentiating into thyroid tissue, to take up the duties of the thyroid when that gland was removed. This is now known to be untrue.

Moussu demonstrated in 1897 that complete removal of the parathyroids produced death in convulsions, now known as tetany.

The parathyroid glands vary from four to one in number. Of 64 cases studied by Laignel-Lavastine and Duhem,[1] 11 had 4 parathyroids, 18 had 3 parathyroids, 15 had 2 parathyroids, 17 had 1 parathyroid, 3 had no demonstrable parathyroids. It is possible in these last three cases, and also in some of the other groups, that parathyroids were present which could not be demonstrated.

When all are present, two are located at the top of the gland, on the posterior surface, in close relation to the terminal branches of the inferior thyroid arteries, and two are located at the inferior pole of the gland, on the posterior surface, where the branches of the inferior thyroid artery and the recurrent laryngeal nerve are in close relation.

We have demonstrated parathyroid bodies a great many times in thyroid operations and have seen them present in unusual locations. The most constantly located gland has been the one at the entrance of the inferior thyroid artery, on the posterior surface close to the trachea. We have seen glands, corresponding in every way to parathyroid glands, well out toward the outer border of the posterior surface of the thyroid, and well down to the lowest portion of the gland where the inferior thyroid veins and thyroidea ima artery enter the gland; likewise, a presumably parathyroid gland lying directly on the anterior inferior surface of the thyroid near its outer border; and, also, superior parathyroids entirely free from the thyroid gland lying within the bundle of the superior thyroid vessels just before their connection with the superior thyroid pole. Therefore it is obvious that the location and relationship of the parathyroids are by no means constant.

One of the greatest difficulties with the entire parathyroid problem is that these glands are not of sufficient size or distinctiveness to permit one to be certain of their true identity without removing and submitting them to histological examination, and it is doubtless this fact which has resulted in such a number of contradictory results in the production of tetany in animals, and possibly in the therapeutic effects of parathyroid feeding.

The following characteristics have been noted by us in parathyroids seen in the course of several hundred thyroid operations. They are elliptical, clean-cut, brown bodies varying in size from slightly less than the head of a match up to slightly less than the smallest pea bean. They are soft, their surface is smooth and shiny, often showing the striations of fine blood-vessels beneath their covering; they are movable, elevated, and to be distinguished from lobules of thyroid tissue by the fact that on careful examination they will be found to be entirely separate from the thyroid and bound to it by delicate connective tissue in which are the nourishing vessels. Accessory parathyroids have repeatedly been demonstrated in animals and no doubt may exist at times in man.

The parathyroid bodies have been suspected of playing a part in epilepsy, myotonia, paralysis agitans, eclampsia, the infantile spasmophiliae, and the tetanic attacks in adults not occurring as a sequence to thyroid operations. The relationship in this group of cases is based almost solely upon the fact that the characteristic features of those diseases are tetanic in form and tetany is known to occur with removal of the parathyroid. Further, that during the tetanic attacks, particularly in spasmophilia and adult non-surgical tetany, there is found, as in surgical tetany, a lowered calcium content in the blood. Suspicion as to their relationship results also from the fact that beneficial results have been claimed especially in the two last-mentioned conditions—spasmophilia and non-surgical tetany—from calcium treatment which is known to be of value in surgical tetany. As to the proven relationship of the parathyroids in these diseases, there is none. No pathology of the parathyroids has been proven nor has parathyroid feeding proven of value.

Osteomalacia and rickets are bone diseases whose origin has at times been attributed to functional disturbances in the parathyroid glands. The theory of relationship in this group of bone cases has been based upon the proven fact that the improper bone development is the result of calcium deficiency, and since it is known that there is an increased calcium output in the urine and fæces, and a diminished amount of calcium in the blood and brain during the tetany which follows the removal of the parathyroids in animals, and since it is known, also, that the administration of calcium to parathyroidectomized humans or animals is beneficial and in most instances controls the tetanic attacks, it is presumed that there is a relationship between these bone dis-

eases and the parathyroids. When, however, it is realized that tetany can be relieved also by acid administration (Wilson) or by infusion of soluble strontium salts (Berkeley and Beebe) as well as by calcium salts, and when it is further realized that the above-mentioned bone diseases are not influenced by the administration of either calcium or parathyroid extract, and that no parathyroid pathology is demonstrable in these conditions, the relationship as in the previous group becomes equally less tangible.

As to the administration of parathyroid extract, in the first group of cases no benefit has been obtained from its use in epilepsy, myotonia, eclampsia, the spasmophiliae of childhood, or the non-surgical attacks of tetany. Claims have been presented as to its therapeutic value in paralysis agitans, and cases have been cited in which improvement in symptoms in this disease has been accomplished by means of transplantation of parathyroid glands. Regarding the administration of beef parathyroid in this disease, the method has now been used for several years without producing striking and convincing results. Regarding transplantations of parathyroid in paralysis agitans, a very limited number of such transplantations have been favorably reported from foreign clinics, but inasmuch as unsuccessful transplantation of parathyroids in tetanized animals and humans has been almost the universal rule, one must accept these one or two cases only with considerable reservation. Where transplantations for tetany are done close to the onset of the disease (as they usually are), one may rightly suspect that if a cure follows the transplantation, a remaining parathyroid may have resumed its function.

Tetany following surgical parathyroidectomy may therefore be said to be the one constant and tangible state which may be directly attributed to parathyroid deficiency. It may be consistently produced by the removal of the parathyroids and in a constantly characteristic form. Unfortunately from the point of view of proof, however, it apparently is not constantly cured by the administration of parathyroid extract, as is the case in thyroid feeding in myxoedema.

It appears within two to five days following operations on the thyroid gland, one case having been reported four hours post-operative. In the complete and severe form there are convulsions, spasmodic contractures with the hands in the characteristic accoucheur's position, rapid respiration, salivation, and death in coma.

The mild or transitory types are due quite probably to partial parathyroidectomy, the attacks occurring when additional loads are thrown upon parathyroid tissue not sufficiently abundant to meet the unusual demand.

In this recurring and less severe type it is possible to observe the signs of the disease with greater deliberation. The earliest complaints in the three transitory cases which we have seen have been stiffness and tingling in the hands and feet, followed by spasmodic contractures of the hands and feet, with the fingers in the characteristic position of the accoucheur's hands, the fingers flexed at the metacarpophalangeal joint, the hand flexed at the wrist and the thumb on the palm, the arms flexed at the elbow. These attacks have passed off within a few minutes and have been controlled by the administration of calcium lactate and parathyroid extract. The condition is further characterized by Trousseau's sign, contraction particularly of the fingers and thumb on pressure over the large nerves of the arm; Chvostek's sign, a spasm of the face seen on tapping over the trunk of the facial nerve; Erb's sign, an increased irritability of the peripheral nerves to weak galvanic currents. The entire picture of the disease is one of hypersensitiveness of the peripheral and also the central nervous system.

Our own experience with tetany has been limited to three cases, all transitory in character. Two received both calcium lactate and parathyroid extract with prompt relief. One has had no recurrence of the attacks since leaving the hospital, and one has had occasional attacks at rare intervals. The third case was first placed upon parathyroid extract without effect, and later controlled by the administration of calcium lactate.

Two of the cases of tetany occurred out of 342 thyroid operations during the year 1921, and one has occurred this year, 1922, out of 128 to date. None occurred in over 500 thyroid operations previous to 1921. Our explanation of the recent occurrence of tetany in our hands is that we have in recent years felt it necessary to remove more thyroid tissue to accomplish the most complete degree of cure, and have in this way perhaps more often jeopardized the viability of the parathyroids. We regret that in each of our three cases separate medication as in the last was not tried out, submitting the patient first to parathyroid extract and later, if necessary, to some form of calcium administration.

Since there seemed to be a divergence of views regarding the therapeutic value of parathyroid extract, we sent a questionnaire to a number of surgeons as to their success in treating tetany, the type of treatment used, and the results.

Two reported that they had used parathyroid extract alone, successfully controlling the tetany. Of these two, one states that dried beeves' parathyroid controlled the attacks promptly, but that later the patient was given calcium in small doses which sufficed to control

the manifestations. The other reports that calcium lactate had no effect, but that parathyroid extract by mouth controlled the symptoms at once. This patient died later, however, in epileptic convulsions.

One reports definitely that his experience with parathyroid extract has been unsatisfactory.

One clinic reports that they have not used it for a year, employing calcium instead.

One reports giving as high as 15 grains of parathyroid extract a day. He does not think it was of value, but used calcium lactate with it. Signs disappeared in two weeks. In his opinion recovery was due to spontaneous return of function.

One reports parathyroid used without effect, but comments that the preparation might have been old.

One reports that in his experience ordinary parathyroid extract tablets have been entirely useless, and states that repeated use of the microscope has satisfied him that the material may be of another character and seldom is really parathyroid.

Seven report very satisfactory results with calcium in the form of calcium lactate; one of the seven states that he at times employs calcium bromide, and one that he employs calcium chloride 10 per cent. sol. 5 c.c. intravenously, taking care that it is introduced slowly, as painful indurations follow its diffusion into the tissues.

One reports that all cases are given calcium post-operatively in view of the possibility that they may show tetany (calcium chloride elix. 2 drachms T. i. d.).

Two, excluding our own experience, employed parathyroid extract combined with calcium.

From the foregoing it seems quite probable that at least the average parathyroid extract is of doubtful value, and that calcium in the form of lactate or chloride is more dependable. It is further probable that particularly during the attacks when prompt relief is sought, the administration of calcium intravenously results in more prompt effect than when given by mouth, where absorption is slow. It seems probable, also, that when given by mouth, in fairly large doses, 15 to 20 grams of the lactate, provided it does not produce nausea, should be given.

It is impossible from the data which we have at hand to estimate other than roughly the incidence of tetany in thyroid operations. We have totaled the number of cases of tetany and the number of thyroids operated where this data was given in the replies, with the following result:

In approximately 5600 operated thyroid cases, tetany appeared in 27 cases, of which number three were fatal within a short time and 24 were apparently transitory in character. Except in our own three cases, which are progressing favorably, we have no facts as to the eventual outcome in the transitory cases.

There is much experimental evidence upon which to base calcium feeding in this condition. Wilson, Stearns, and Thurlow[2] demonstrated in tetanized dogs that an alkalinity of the blood develops after parathyroidectomy, and that the same lowering of the alkalinity may be accomplished with calcium as after the injection of acid.

The electric irritability which is increased in tetany when the calcium content is low (Erb's sign, increased irritability of peripheral nerves to galvanism) has been shown by Rosenstern[3] to be diminished when large quantities of calcium are administered by mouth.

Peripheral Irritability. — MacCallum has shown that if the extremity of an animal be perfused with blood from a parathyroidectomized animal or blood from which the calcium has been removed, the electric irritability is increased, and if the limb is again perfused with normal blood the hypersensitiveness in this part disappears.

MacCallum has proved that the effect of the poison is upon the nerves and not the muscles by cutting the innervation of a muscle away and not obtaining the tetanic contraction with tetany which is obtained when the innervation is complete.

In addition to the above, tetany has been brought about both in children and in adults by the administration of soda bicarbonate. It has also been produced by voluntary prolonged hyperpnoea, probably as a result of the disturbance of the acid-base equilibrium in the body, producing an increased alkalinity of the blood and urine, a diminution in the plasma bicarbonate, and a lower carbon dioxide tension.

As has previously been stated, MacCallum has demonstrated in tetanized animals an increased output of calcium in the urine and the fæces and a lowered amount in the blood and brain.

CONCLUSIONS.

Tetany undoubtedly follows complete removal of all of the parathyroids.

It occurs in two forms, mild and transitory, or severe and fatal.

Parathyroid pathology has not been demonstrated in the other diseases characterized by calcium deficiencies or tetanic seizures.

Surgical tetany, therefore, is the only disease which may now be attributed to parathyroid deficiency.

Clinically and chemically it simulates other diseases which are apparently the result of disturbances in the acid-base balance.

With the appearance of its symptoms there is a definite increase in alkaline balance, a

decrease in the acid balance; and a disappearance of symptoms when this balance is restored by the administration of calcium in some form.

Calcium, therefore, by mouth in the form of calcium lactate and by vein in the form of calcium chloride or calcium lactate, is the most effective form of treatment. In transitory cases it will undoubtedly tide patients over the attacks. In the severe form it perhaps prolongs life, but death probably eventually results.

It is doubtful if the average commercial parathyroid extract is of value in surgical tetany, and it is quite certain that it is of no value elsewhere.

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PITUITARY GLAND THERAPY.

BY W. RICHARD OHLER, M.D., BOSTON.

In presenting a few remarks on the subject of pituitary gland therapy no attempt will be made to review the literature on the subject, nor to set up definite standards or rules of treatment. The whole subject is still none too clearly understood even by those who confess to a rather extensive use of this form of therapy. My purpose is simply to review very briefly the more generally accepted clinical signs of disturbed pituitary function and to suggest what may be expected from glandular therapy.

It is generally accepted that the clinical manifestations of pituitary disorders are produced by over-function (hyperpituitarism) or under-function (hypopituitarism) of the whole gland, and various combinations of over- or under-function of separate lobes of the gland, so-called dyspituitarism. Attempts have been made to group symptoms according to over- or under-function of separate lobes of the gland, but in the light of our present knowledge it seems best to speak only of over-function or under-function of the whole gland. In doing so use has been made of various texts and articles, but particularly of the publications of Cushing and his co-workers.

Briefly the clinical signs are as follows:

I.—Over-function (hyperpituitarism).

1.—Acromegaly and a certain type of gigantism are usually associated with hypertrophy and hyperplasia of the anterior lobe.

A.—Skeletal changes—

a.—If ossification of epiphyseal cartilages incomplete before onset of disease, changes result in a fairly normally proportioned giant.

In this connection it is well to point out that in eunuchs the skeletal changes are probably due to pituitary hyperfunction secondary to deficiency of testicular hormone. This apparently establishes a definite relationship between testicular hormone and pituitary action.

b.—If ossification of epiphyseal cartilages complete, the skeletal changes are characteristic of acromegaly.

Acromegaly may be engrafted on primary gigantism, resulting in an acromegalic giant.

B.—Characteristic skin—subcutaneous and visceral changes.

(The above symptoms have been described as due to over-function of the anterior lobe.)

2.—Hyperglycemia and glycosuria—

There is experimental evidence that stimulation of the posterior lobe produces hyperglycemia and glycosuria in animals.

Furthermore, glycosuria may be present during active stages of pituitary gigantism and acromegaly.

II.—Under-function (hypopituitarism).

1.—At puberty—

Skeleton takes on feminine form and also in males there is little or no beard and feminine distribution of pubic hair. In females likely to be absence of axillary and pubic hair.

2.—Before puberty—

Failure of development of external and internal genitalia, resulting in some degree of sexual infantilism.

3.—After puberty—

Diminished sexual activity or complete loss with impotence or amenorrhea.

Identical skeletal and genital conditions can be produced in dogs by partial anterior lobectomy.

(The above symptoms have been described as due to decreased function of the anterior lobe.)

4.—Before full stature obtained—

Bones do not develop to normal size. Result is a fairly normally proportioned dwarf.

On this point there is considerable doubt. Dwarfism is probably not due to disturbance in the pituitary alone.

5.—Adiposity, whether onset before or after adolescence.

6.—Increased sugar tolerance.

7.—Drowsiness and mental dullness.

8.—Asthenia and lowered body temperature.

9.—Hypotension.

10.—Polyuria—

At present weight of evidence in favor of lesion of posterior lobe, either direct or by pressure, as cause of diabetes insipidus.

11.—Epilepsy—

A certain number of epilepties are found among adipose hypopituitary cases where there is no evidence of tumor.

(The above symptoms have been described as due to decreased function of the posterior lobe.)

12.—Fröhlich's syndrome—

Adiposity associated with genital infantilism. Condition has been produced in animals by removal of posterior lobe and part of anterior lobe. Clinically the condition is one of hypopituitarism.

III.—Dyspituitarism—

Theoretically various combinations of over- and under-function of both lobes are possible. Any combination may begin before or after puberty with different results. Furthermore, hypofunction may follow hyperfunction of the same lobe.

IV.—Polyglandular syndromes—

The problem of disordered pituitary function is sufficiently complicated in itself, but becomes even more intricate by the tendency of other ductless glands to enter into the picture.

V.—In regard to pituitary, apart from the clinical signs enumerated, there are certain procedures which may give valuable aid. As for example:

1.—Signs and symptoms of brain tumor.
2.—Wassermann.
3.—Visual fields.
4.—Sugar tolerance.
5.—Basal metabolism.
6.—X-ray of sella turcica.
7.—Blood pressure.
8.—Temperature changes.
9.—Careful kidney studies.

The subject of pituitary gland therapy is certainly one about which the profession needs more information, and especially information which is both detailed and accurate. For this reason it is to be hoped that in dealing with such cases clinicians will emphasize the following points:

1.—Careful and detailed clinical and laboratory study for the purpose of detecting evidences of disturbed gland function. Such studies are particularly necessary in cases where there may be disturbances in more than one gland.

2.—The use of gland products with special reference to the clinical symptoms. Up to the present practically no therapeutic effects have resulted from the use of the anterior lobe of the pituitary alone and the effects from the use of the posterior lobe have not been encouraging. Generally speaking, where results have been obtained the whole gland has been used. It would be of interest to collect more data on the therapeutic use of separate portions of the gland.

3.—In general the use of the pituitary gland products alone rather than in combination with other glandular products. This suggestion is made in order to procure more accurate therapeutic information. Certainly very little is to be learned from the use of hit or miss polyglandular products.

OVARIAN GLAND THERAPY.

BY FRANK A. PEMBERTON, M.D., BOSTON.

To obtain a clear idea of the present status of ovarian gland therapy it is wise to review some of the facts regarding the source, action and preparation of the material used in the treatment.

It has been practically proved that the cells of the corpus luteum and the theca cells of the Graafian follicles, especially the atretic ones, manufacture the secretion. It is probable that there are interstitial cells in the stroma of the ovary that also supply the secretion. The presence of these cells in sexually mature ovaries is denied by some (Myer, Frankl), and though declared to be present, their secretory activity is thought to be slight by others (Fellner).

The isolation of the exact secretion chemically has not been satisfactorily proved up to the present. Fellner has isolated what he terms a sexual lipoid from the corpus luteum, interstitial cells, and placenta, which experimentally causes enlargement of the uterus, vagina and breasts, but does not influence menstruation. Herrman has isolated a somewhat similar one, Seitz also. Wintz describes two substances from the corpus luteum which appear to have opposite effects on the blood pressure, coagulation time, and bleeding from the uterus. There is no unanimity of opinion, however, as there is in regard to the internal secretion of the adrenal and thyroid.

It is thought by some that there is more than one secretion with somewhat different effects. Theoretically, extract of corpus luteum is supposed to inhibit menstruation because of the large, permanent corpus luteum found in pregnancy, and its use is accordingly advised in excessive bleeding, while extract of the whole ovary and of the ovary without the corpus luteum are used for decreased menstruation and amenorrhoea. Opposed to this is the experience of many that corpus luteum and whole ovary extracts appear to have the same effect on abnormal bleeding. Graves' suggestion that, as the different cells which manufacture the secretion have the same embryological origin, it is probable that their secretions have the same qualities, is reasonable and is borne out by clinical experience.

A great difficulty in this therapy is that the manufacturers have no common process for producing the preparations which are used, and there is no means of standardizing them. The tissue of the glands of internal secretion is said to deteriorate more rapidly than other tissues, so the manufacture should take place immediately after removal. The ovarian preparations, except those put up in ampules, seem to deteriorate in time and should be used comparatively soon. The corpus luteum extracts appear to do this earlier than the others. This deterioration is probably a decomposition which shows its presence by a digestive upset in the patient.

The preparations used are an extract of the whole ovary; an extract of the ovary with the corpus luteum previously removed, called ovarian residue; and extracts of the corpus luteum alone. They are put up in capsules of the powder, in tablets, and in ampules, the last being reserved mostly for corpus luteum extract in this country.

The mode of action of the preparations is not definitely settled. It may be simply a stimulative action on the ovaries and other glands of internal secretion which appear to be closely related to the ovary, the thyroid, adrenal and hypophysis. It may be a substitute for an entire lack of ovarian secretion, as after castration, but this action does not appear to be as definite as in the case of thyroid extract used in cretinism. Esch thinks the action is so unspecific that it may be explained as a reaction against a protein. He has had suggestive results in treating menstrual disturbances with human milk protein given subcutaneously, getting effects similar to those following ovarian organotherapy.

On the whole it is probable that the effect is a stimulating or balancing effect on the internal secretory organs with some substitutive action.

From this review it may be deduced that there is no settled method for using ovarian preparations. They are all being tried for all the various diseases without bringing any one of them strikingly to the fore for any particular disease. Attempts are being made to increase their efficiency by combining other gland therapy with them in cases which show derangement of two or more glands.

The characteristic symptoms for each gland and combinations of glands are gradually being worked out. It must be remembered in all organotherapeutic treatment that more than one gland may be at fault.

They are perhaps most useful in treating the symptoms of the menopause, the hot flushes, nervous troubles and high blood pressure. It is generally acknowledged that all three preparations are valuable, but that the whole ovary and residue are more efficacious than the corpus luteum. The hot flushes, which is the symptom that the patient complains of most, are relieved to a great extent and in a good many cases stopped. The general condition is improved, showing that there may be a tonic effect. In the artificial menopause, following castration, the effect is more prompt and decided than in the natural menopause. The symptoms following castration may be avoided to some extent by starting the ovarian extract before operation. This may be advisable in the nervous, high strung, thin type of woman.

There are cases of high blood pressure occurring at the natural menopause which show no organic lesion, such as cardio-renal disease. Ovarian extract here seems to lower the blood pressure in some cases, but must be kept up in large doses for some time to obtain the effect.

Menstrual irregularities, such as delayed catamenia; slight bleeding before and continuing after the usual menstruation; clotting and temporary functional amenorrhoea are all favorably influenced by ovarian therapy, bringing about a normal cycle.

There are some cases of headache of the migraine type occurring at menstruation only and disappearing at the menopause, which give brilliant results with the use of ovarian therapy. The residue or whole ovary is used.

Menorrhagia and metrorrhagia must be of the internal secretory type to be influenced by this therapy. If there is any definite pathology, such as fibroids, polyps and pelvic inflammation, organotherapy is not indicated. There are a good many reports of the successful treatment of the bleeding at puberty and the climacteric treated by this method, the most promising being those from Germany, where the preparation is given more often intravenously than here. It is in these cases that many recommend corpus luteum extract especially.

Amenorrhoea of a permanent type, coming on with a progressive decrease in the amount of menstruation or characterized by only occasional periods, is not so amenable to this treatment. It must be kept up for a long time in rather large doses. If the patient is putting on weight rapidly it may be wise to add thyroid extract to the ovarian. They may menstruate more often under treatment, but are not likely to have the normal menstrual cycle reestablished.

The treatment of essential dysmenorrhoea, where there is no pathological condition except mal-development of the uterus, is fairly successful in relieving the discomfort and increasing the amount of flow in a good many cases. Here again the reports from Germany under intravenous administration are more promising. It is generally acknowledged that the residue and extract of the whole ovary are more efficacious than the corpus luteum.

The value of ovarian therapy in sterility is not definitely established, but it is used in those cases which complain of amenorrhoea and dysmenorrhoea.

It is recommended in the vomiting of early pregnancy, but the reports of its results are conflicting. Here extract of corpus luteum is used on the theory that the vomiting is due to an undersecretion on the part of the corpus luteum of pregnancy. From the same point of view corpus luteum is administered to cases having successive miscarriages without demonstrable cause. Not enough work has been done to determine its value.

Ovarian therapy is recommended for lactation atrophy, infections such as kraurosis and furunculosis of the vulva after the menopause, on the theory that it increases the blood supply to the parts; mild cases of hyperthyroidism, as the ovary is believed to be antagonistic to the thyroid; and in chlorosis combined with the usual treatment.

We think it fair to conclude that ovarian therapy is valuable, but it is not established on a sound basis as yet, because the actual secretion has not been isolated; the preparations are not standardized as to strength; and they deteriorate fairly rapidly.

DISCUSSION.

DR. J. C. AUB: Throughout the evening, a discussion of the interrelation of glands of internal secretion has been avoided. The impression from the symposium has been discouraging as to the present value of the use of these various glands in treatment of true endocrine disorders. I think it ought to be brought out that there is the added difficulty of diagnosis, which is increased because most cases present not a defect of one gland but of several.

The basal metabolism, which is the only good functional test for the internal secretions, demonstrates this difficulty. It is affected not only by the thyroid gland, but also somewhat by disturbances of the gonads and pituitary, though very possibly these last two produce the effect by means of an interrelation with the thyroid. On the other hand, the adrenal gland seems to be an independent mechanism and may cause fluctuations of short duration, probably through its secretion—adrenine. This, therefore, suggests the complexity of their activities, and the difficulty of determining which gland is primarily at fault in disease. While the relationship of these glands to each other is not clearly understood, we cannot give adequate treatment.

DR. W. B. CANNON: Dr. Aub asked about the importance of knowing the interrelations of these glands. I have no doubt whatever that they are very intimately interrelated. We have good evidence in some instances of the way in which the destruction, or overaction of one gland will affect another, but the relations are highly complex. We must learn about them, however, before we shall have a thoroughly rational mode of taking care of complicated endocrine disorders.

Dr. Lawrence spoke of using the whole adrenal gland. It is a double gland and he is, therefore, using two substances. I suggest he be bold and separate the double gland into its parts and see what each one will do by itself. Then we would know from what he gets his results. I would make the same suggestion to Dr. Ohler. He is using the whole pituitary. There are, perhaps, three glands, certainly two, in the pituitary, and it might be well for him to try using each part.

Original Articles.

EPIDERMOPHYTOSIS.*

BY ARTHUR M. GREENWOOD, M.D., BOSTON.
Assistant Dermatologist, Massachusetts General Hospital.

THE frequent references to epidermophytosis which we are now seeing and its great prevalence, I believe, warrant this brief sketch of the disease and of its laboratory investigation. The condition is undoubtedly frequently seen by the general practitioner and usually classed with the eczemas, the fact not being recognized that it is parasitic and contagious, extremely difficult to eradicate, and always a potential source of infection to others, besides being exceedingly uncomfortable and often crippling to its possessor.

Epidermophytosis is a form of ringworm. The disease ringworm or tinea includes ringworm of the scalp, tinea capitis; ringworm of the beard, tinea sycosis; tinea circinata, a superficial, ephemeral ringworm of the glabrous skin; ringworm of the nails; and epidermophytosis, or eczematoid ringworm, and in discussing the last we exclude from consideration all the others.

The fungi causing these various forms of the disease belong to three genera: Microsporon, Trichophyton, and Epidermophyton. Strictly speaking, the name epidermophytosis is not correct, implying as it does that this form of the disease is always caused by some species of the Epidermophyton. That this genus was always the cause was the original conception, but recent work has shown the genus Trichophyton in a large proportion of the cases. However, the name epidermophytosis has thus far been retained since it embodies our concept of the disease as distinguished from the other forms of ringworm. This concept is as follows: A chronic, contagious, fungous disease of the skin; highly resistant to treatment; at times to be seen on practically any part of the body, but involving most commonly the hands, feet, groins, and peri-anal region, less often the axillae and under the breasts, all locations where there are heat and moisture, factors favorable to the growth of the fungus. Subjectively, it is usually pruritic, at times excessively so, but practically never negligible from the patient's point of view if the process is at all active.

The form of the disease known as tinea cruris or eczema marginatum was described as early as 1869 by Hebra, but the other forms are of much more recent recognition. The following is a very brief clinical description of the more common forms of the disease.

On the feet it ordinarily manifests itself as a maceration of the skin at the depths of the interdigital spaces, most often between the little and fourth toes. At times macerated hyperkeratotic masses can be shelled out, the so-called soft corns. From the interdigital spaces there may be extensions onto the plantar and dorsal surfaces of the feet, made up of deep vesicles with steel-blue centers and collarettes of fine scales where these vesicles have broken and dried. Very commonly the nail of the little toe is infected and is opaque, softer than normal, thick and irregular, and other nails may be involved. This form ordinarily gives rise subjectively only to occasional itching, but in warm weather or after much walking in shoes and socks which do not allow sufficient aeration the fungus becomes active, the vesicles break out, sometimes becoming bullous on the balls of the toes, and there is severe itching. Another form found on the feet is the hyperkeratotic, in which are seen peculiar yellowish keratotic areas on the soles or heels, not necessarily at points of pressure.

The form of the disease known as tinea cru

*Read in part before the Worcester District Medical Society.

ris or eczema marginatum is undoubtedly familiar to most physicians. It occurs on the inner surfaces of the thighs in the crural region and may extend downward or onto the scrotum and penis and backward over the perineum to the peri-anal region. It manifests itself as a rather dark red, circular area whose border usually shows many fine vesicles, and whose center does not clear as does the ordinary tinea circinata. The surface is rather moist and papular and shows delicate scaling. In the perianal region there is usually some whitish, sodden, macerated epithelium to be seen on a reddened base. Subjectively there is a stinging, burning sensation rather than a real itching, but in the peri-anal region there may be a marked pruritus.

The disease, as it affects the hands, consists of persistent and recurring attacks, lasting over many years, of areas of erythema with scaling, infiltration and fissuring, and always at some time showing the characteristic deep vesicles, usually at the advancing margins. Its most common location is on the backs of the hands, extending onto the webs of one or several fingers. There is involvement of the contiguous finger surfaces, oftenest of the proximal phalanges, but at times extending to the tips and involving the nails. The so-called washerwoman's eczema is probably a fungus infection, and recent work has shown certain yeasts to be the infecting organism in some cases rather than the genera with which we are concerned.[1] All these fungous infections of the hands have for years been diagnosed as eczema, and we are seeing in our clinics cases which years ago were so considered, which have been relieved, but which recur year after year. It is not improbable that all cases of eczema of the hands may be due to fungi, excepting dermatitis from external irritants, infantile eczema, and those of pyogenic origin.

These are the chief and most common forms of epidermophytosis. On other parts of the body they are less distinctive and usually a clue to their origin is to be found in a primary, typical focus on one of the commonly involved regions.

The disease is astonishingly prevalent and apparently increasingly so. In 1919, at the Skin Department of the Massachusetts General Hospital, there were diagnosed 55 cases, including those of eczema marginatum, out of a total of 4065 new patients. At present we see each day at least one new case, frequently four or five, and it should be borne in mind that these are only the ones which are giving symptoms sufficient to bring the patient to the hospital. In a series of 50 patients who came with other troubles one out of two showed evidence of the disease, ready to light up, given the proper conditions, and, what is most important, each one a potential source of infection. Nor is this a disease of the unwashed outpatient. One of the staff at the Massachusetts General Hospital finds it fourth in frequency among the diseases he sees, being outnumbered only by acne, eczema and alopecia. It is very prevalent among students and gymnasium frequenters, one of the popular names for eczema marginatum being "jock strap itch," undoubtedly indicating an accurate observation as to one source of infection. In these gymnasium cases it seems probable that the mats and floors of the showers may be sources of infection. In some cases laundries seem to be implicated, and we have several times seen an acute attack follow the doing of a washing in which presumably some of the clothes were infected. Recently we have seen a very acute case which came on immediately after wearing an old pair of gloves while covering with asbestos preparation a hot steam boiler. The combination of wearing the probably infected gloves with the heat and moisture incident to the work brought on the sudden, universal infection of both hands. It is quite possible that the fashion of wearing heavy wool socks in recent years is responsible for part of the increase in this disease, since such hosiery not only keeps the feet moist and warm but also cannot be sterilized by boiling.

LABORATORY INVESTIGATION.

The cultivation and identification of parasitic fungi, or even their microscopic discovery in the scales and hairs, is always a matter involving time and patience. For some reason the usual clinical manifestations of these mycotic affections are out of all proportion to the amount of fungous growth found, and it very often is a matter of long and careful search before the parasite is discovered. Naturally a negative result in such cases leaves one uncertain whether the fungus is really missing or only missed.

It is possible that much of the clinical manifestation of these diseases is in the nature of a trichophytide, which (like the tuberculide) may be a manifestation in a sensitized skin of the presence of the fungus elsewhere on the body. An interesting discussion of the trichophytide is to be found in Bloch's article.[2] The laboratory end of the study of these mycoses resolves itself into two parts: (a) The examination of the fresh material—scales, hair, or nails; and (b) the cultivation and identification of the fungi.

Examination of the Fresh Material.—(1) Selection of Material. (a) In the macerated interdigital foot cases the best material will be found at the advancing borders of the lesion. In practically every case there will be seen at the junction of the eroded and macerated area

with the normal skin a delicate scaly border, with the unattached end of the desquamating epidermis toward the lesion. If this edge is raised with forceps and gently peeled off toward the normal skin it will most often be found to contain the parasite. The white, macerated material, in my experience, is useless for microscopical and cultural purposes since it is loaded with contaminating pus organisms and saprophytic fungi. These directions also apply to the cases of tinea cruris or eczema marginatum.

(b) The vesicular type. If seen very early in the vesicular outbreak, one should cut off the roofs of some of the vesicles and invert them on the slide so as to examine their under surface. It is a peculiar fact that not all the vesicles so examined will show the parasites, no matter how carefully the examination is made. As far as I know, there is as yet no way of telling from their clinical appearance which vesicles are infected. It is possible that only the early lesions will be positive. Only within the past two weeks have I seen a case in which every vesicle examined was positive, and that was a very acute and extreme case involving both hands, with marked trichophytides on other parts of the body. Mitchell of Chicago, in his recent article on the subject in the *Archives of Dermatology*,[3] states that the brownish, dried vesicles yield him the best results, and my experience agrees with this, especially in the older cases. Sometimes the desquamating collarettes left from this vesiculation will be positive. Crusting and exudative material is of no value, nor are the parakeratotic scales which are often seen.

(c) In the nail cases it is well to scrape the surface with a glass slide and from this cleaned surface to pare thin pieces with a knife. The scrapings with glass are beautifully thin and one is tempted to use them, but they are not of much value because the fungi do not grow in one stratum, and too thin scrapings may only show them in section, when they are unrecognizable.

Having taken the material to be examined, it is the best procedure to keep it between two glass slides whose contiguous surfaces have been flamed. These can be held by a rubber band and marked with a colored pencil for future identification. I believe the slides are superior to envelopes or paper containers since it is much easier to cut up and manipulate the scales in planting when they are on a glass surface; the scales often stick to the paper containers and it is difficult to remove them with as little handling as in the use of slides; and then, too, the paper containers are never sterile.

After the material is collected it may be kept almost indefinitely before planting, and a certain amount of delay is advantageous since it may eliminate many of the bacterial contaminations. An exception to this statement arises in the case of the examination and planting of fresh vesicles. These should be planted and examined immediately. The roofs of vesicles when dried are much more frequently negative than fresh ones from the same case.

For the microscopical examination of the material, use is made of the clearing effect of KoH or NaOH on the tissue cells, while the fungi are resistant, the result being that the fungi show as refractile bodies against a fairly clear background. The disadvantage in the use of KoH is that in a comparatively short time, depending on the strength used, the fungi are affected also, so that for permanent preparations some other clearing solution is necessary.

For rapid work a 40 per cent. aq. solution of KoH is used and the slide very gently heated. By this method scales may be examined in a few minutes. For slower clearing and more permanent preparations which will keep for about ten days one may use equal parts of a 30 per cent. solution of KoH and glycerine. This should be heated also, and scales are well cleared in one or two hours if not too thick. This is the method of choice unless permanent preparations are wanted.

For permanent preparations which will last for six months to a year, or perhaps slightly more, we use

Lactic acid	1 part
Phenol	1 part
Glycerine	2 parts
Distilled water	2 parts

This clears quickly and well, its only disadvantage being a tendency to the formation of very fine, long crystals which might deceive the beginner when searching for the fungi.

These permanent mounts have to be ringed with a cement, and by far the most satisfactory for this or any similar purpose is one made by Professor R. E. Schuh, Howard University, Washington, D. C.

Before clearing scales it is always wise to remove the fat by washing with ether. The KoH on a scale which contains much fat gives rise to many refractile globules which may be very deceptive and may make one think they are mycelial fragments. These globules, however, vary a great deal in size—much more so than mycelial fragments ever do. The KoH also affects many of the epithelial cells, so that they appear crowded with spores; an appearance which should not deceive the investigator, since these fungi do not penetrate the cells and do not form spores in the human host.

Having mounted and cleared the specimen, one searches with patience for the parasite,

which should appear as a refractile septate strand—sometimes branching, and sometimes broken up in a chain of fragments. Often separate fragments or bodies resembling them are seen, but one should never make a positive diagnosis on one or more fragments unless they are found in chains. These fragments are commonly spoken of as spores, but most authorities agree that they are not true spores but fragments of the hypha or vegetative part of the fungus.

The high dry lens of the microscope should be used, with much of the light cut off, and since the scales are usually quite thick one must examine all levels by focussing up and down. When expert, the fungi can frequently be picked up with the low power, which is a great saving of time, but in all cases, before pronouncing a case negative, several hours should be spent in careful search.

There are various staining methods which have been used to demonstrate the fungi in scales and hairs. Personally I do not use any of them for the ordinary clinical work. They take much more time than the methods just described, and are uncertain and rather unsatisfactory in their results. Practically their only advantage is in the making of permanent preparations, and even in the best preparations there is a certain amount of distortion, so that the picture is not the same as that of the fresh specimen.

All the fungi show two stages of growth—the simple vegetative, and the form in which certain portions of the hyphae are differentiated for the purpose of reproduction. The primary reproductive body of the fungi is called a spore, and in the fungi it performs a function analogous to that of seeds in the higher plants. The vegetative forms are practically all alike—certainly not sufficiently different to allow identification of the different genera and species in the scales or hairs, so that the manner of producing spores or fruiting bodies is the chief means at present known for such identification. The reason for this short excursion into mycology lies in the fact that in the host the fungi show only their vegetative form, and in order to discover their manner of spore production and other distinguishing features they must be grown outside the host. This, then, is our reason for cultivating these organisms, to allow of their identification and classification, and to correlate if possible the various genera and species with definite clinical manifestations. Such work has not advanced very far. The mycological classification is still very hazy and the differences between many species are slight. One other mycological detail must be mentioned before considering the culture media. On the media containing sugars most of these fungi, after a varying length of time, take on the so-called pleomorphic form, which is a return to the vegetative manner of growth. This shows as a white, fluffy overgrowth of hyphae, which do not produce spores, and transplants from which always show this same pleomorphic growth, never the characteristics of the original culture. On this account all cultures have to be grown on two media, one containing carbohydrate to show the fructification, and the other, without carbohydrate, to preserve the culture from the pleomorphic change.

All these fungi show different manners of growth on different media, and the following were devised by Sabouraud in Paris as international proof media, so that results in different countries might agree. Unfortunately the war interfered with the production of the French sugars used, so that work is now being done in this country to find what sugars can be used with the same result.

Sabouraud's media were as follows:

(a)	Glucose	4%	(b)	Maltose	4%
	Peptone	1%		Peptone	1%
	Agar	1.5%		Agar	1.5%

and (c) The conservation media

Peptone	3%
Agar	1.5%

The French glucose and maltose are no longer obtainable, but it has been found that for practically all purposes American pure dextrose (DifCo) will do. French peptone (Peptone Chassaing) is necessary in growing certain fungi on account of its acidity, and it is still available.

The ingredients are mixed as usual in making media, and sterilized, care being taken not to overheat in the sterilization as this changes the sugars. Short fractional sterilization is the best method. For the first plantings of the original material slants in tubes are used. For further study of the growths obtained plants are made in Erlenmeyer flasks, which give more material and space for the fungi to show their characteristic manner of growth. Petri dishes may be used, but they do not give a sufficient depth of media, and contaminations are apt to creep in at the edges. The water of condensation which collects on the cover also interferes with inspection and photography of the growth.

In making the first plants the dried scales are cut up into very small pieces and planted on the agar, about four pieces to a tube. At least 20 plants should be made in each case, but often as many as a hundred are necessary before getting a growth. The great obstacle to pure cultures is the presence of pus organisms and saprophytic moulds. Various methods have been used to inhibit these, such as flaming the scales, washing in alcohol, putting gentian violet (1:500,000) in the media, etc.,

but none of these are very satisfactory. Contaminations are the great bane of this work.

The cultures are grown at room temperature. After obtaining a growth it is transplanted to the three different media and its growth on each is compared. It is grown in hanging drop preparations of glucose bouillon, and direct mounts are made and mounted in glycerine for study. The authoritative work on this subject is by Sabouraud.[4] Unfortunately our results do not always check up with his, partly because our media differ, and partly, also, because we probably have a different flora in this country.

This part of the subject should not be left without warning any who may be interested that the results, especially of the cultures, are distinctly discouraging compared with the amount of time and patience expended. Personally, after nearly two years' work I am unable to get growths in more than one out of four or five cases investigated—that is, of the cases in which the skin is affected. In practically every case of ringworm of the scalp the fungus can be grown. The work is important, however; it offers practically a new field and can be carried on in spare moments and without the necessity of elaborate laboratory paraphernalia.

TREATMENT.

In marked contrast to tinea circinata, epidermophytosis is ordinarily very resistant to treatment, and it is difficult to explain why an organism which exists in the host only in its vegetative form should be able to resist for so long parasiticidal applications, or why it should so frequently recur in its original site long after all traces have apparently disappeared.

Probably the application most commonly used in this country is Whitfield's ointment. The formula for this as given in the last edition of Whitfield's book is:

Acid benzoici	gr. XXV
Acid salicylici	gr. XV
Paraffini molli	ʒ II
Ol. cocois nuciferae ad	℥ I

Most dermatologists in this country use it somewhat stronger than this, even up to 12 per cent. and 18 per cent. of the salicylic and benzoic acids respectively. To a certain extent this ointment may be used as a therapeutic test, since dermatoses resembling epidermophytosis are quite apt to be made much worse by its use. A certain number of bona fide cases of the disease are, however, much irritated by Whitfield's ointment, so that the test is not decisive.

In France, chrysarobin in one per cent. strength is used more than in this country. Its drawbacks are its staining properties and its severe irritant action if not used with precaution. There is no doubt, however, that it is a valuable application. It may be used in an ointment or painted on in liq. gutta percha.

Whitfield recommends for the resistant foot cases:

Chrysarobin	ʒ I
Ether sulphurici	
Acetone	aa ʒ IV ss

painted on during the day, and the benzoic and salicylic acid ointment at night.

Iodin undoubtedly has stronger parasiticidal effect on these fungi in vitro than any of the other substances employed. When used clinically, however, it is far from being infallible. It is used as the tincture, painted on; in ointments, 5 per cent., goose grease being the best excipient.

Dr. E. Wood Ruggles[5] reports success from the use of this ointment:

Zinc Oxide	6.
Ung. picis liq.	12.
Phenol	1.
Ung. Aq. Ros.	18.

followed, after the eruption has well subsided, by

Tinct. Iodi.	4.
Spir. Camph. ad	28.

Other methods are 1:5,000 potassium permanganate soaks or hot fomentations for 15 minutes three times daily—combined with Whitfield's ointment. Saturated aqueous solution of picric acid painted on twice daily for a week. This should not be used continuously for longer than this on account of danger of absorption.

The x-ray has been used with some success and seems to act by modifying the skin so that it is no longer favorable to the growth of the fungus. The x-rays are not directly parasiticidal.

Ultra-violet ray therapy acts favorably in a certain number of cases, probably because of its desquamating effect.

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AUTOMOBILE EXHAUST GAS AS A HEALTH HAZARD.*

BY YANDELL HENDERSON, PH.D., NEW HAVEN, CONN.

Laboratory of Applied Physiology, Yale University.

WITH every advance in industry and the arts there is liable to be associated some new physiological strain or health hazard. This has been

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true of machinery, of the chemical industries, of electricity, and it is now proving true of man's latest and most widely used utility, the automobile. As a rule, however, the hazard has been confined to some particular group of workers or class of persons. The risks involved with the automobile are, however, almost universal. The loss of life in accidents as reported in the daily papers is so common that it is receiving serious attention, although not yet very effective measures of amelioration,—as everyone knows.

But it is not very generally realized that the exhaust gas from automobiles constitutes scarcely a less serious health hazard. Fortunately, however, engineers are beginning to recognize that the sanitary side of large public undertakings, and even of some private developments, deserves study, and the public is learning to expect this protection. Accordingly, when plans were made for the construction of the first long vehicular tunnel in this country, these plans included extensive investigations of the basic facts necessary to the ventilation of such a tunnel, so as to render it not only safe but practically innocuous to its passengers. This is the more important as such tunnels will probably, to a considerable extent, replace bridges in future, both because of their cheaper construction, and because they do not obstruct the waterways.

The Commissions of the States of New York and New Jersey, charged with the construction of the vehicular tunnel, or rather tunnels, under the Hudson River, arranged with the United States Bureau of Mines to undertake these basic investigations. The work was divided into several special problems, of which we need here consider only two, namely: (1) the amount and chemical composition of the exhaust gas produced by various cars under various conditions of speed, load, and temperature; and (2) the physiological effects of the substances in exhaust gas, and their allowable amounts not involving appreciable ill effects when such gases are breathed.

The first of these problems was placed in the charge of Mr. A. C. Fieldner, at the Bureau of Mines Experiment Station, in Pittsburgh. An extensive investigation was carried out by him and his collaborators, and has shown that to a large extent the deleterious character of exhaust gas of automobiles arises from the tendency of drivers to adjust carbureters so as to afford a maximum of power, rather than to utilize fuel with the maximum efficiency.[1] The gasoline mixtures used are generally much richer than would be best both from an engineering and sanitary standpoint. More flexible carbureters and greater use of the adjustments, so as to attain the required speed and power with a minimum of fuel, would not only result in reducing the waste of gasoline, but in an exhaust gas distinctly less injurious to health. These investigations show that approximately one-third of the fuel value of gasoline is wasted and that the carbon monoxide, the particular toxic constituent of exhaust gas, averages about 7 per cent. As regards the total quantity of exhaust gas produced, it is sufficient to say that most passenger cars, with the usual carbureter adjustment, produce from 1 to 2 cubic feet of carbon monoxide per minute.

The second problem above referred to was investigated by the writer with the collaboration of Dr. H. W. Haggard, Dr. A. L. Prince, M. C. Teague, R. M. Wunderlich, and a number of chemists for the analytical work, in the Laboratory of Applied Physiology in Yale University.[2, 3] Our investigations have completely confirmed the conception of Paul Bert, Haldane, and other investigators, that carbon monoxide does not form a permanent compound with the haemoglobin of the blood, but competes with oxygen. It has an affinity about 300 times as great; it is able not only to displace oxygen but to be again displaced by oxygen, when a person who has absorbed a certain amount of gas breathes pure air, or air enriched with oxygen. Our investigations also show that carbon monoxide has no other toxic characteristic except its combination with haemoglobin and exclusion of oxygen; it has no direct effect upon nerve cells; all of the nerve degenerations induced by carbon monoxide are due to this asphyxia. Dr. Haggard has, indeed, even succeeded in growing nerve tissue in considerable amounts of carbon monoxide.[4] Animals, such as flies and other insects, which have no haemoglobin, are as entirely immune to any effect of carbon monoxide as they would be to nitrogen, the most inert of gases.

Our investigations show further that when gasoline, distilled from petroleum, is used, practically the only toxic constituent in the exhaust gas is carbon monoxide. When, however, benzol, and probably other related substances are present, as in some of the automobile fuels now sold, the amount of these substances escaping in the exhaust gas adds decidedly to its toxicity.[5]

Our investigations were carried out at first on ourselves and the other members of the investigating staff, in an air-tight room, lined with sheet iron. The data so obtained were later confirmed by large-scale experiments in which a dozen or twenty people at a time sat or moved about in a garage building in which a Ford car was installed. A drop of blood was drawn from a finger and analyzed colorimetrically for the percentage saturation with carbon monoxide; the pulse was counted; the volume of respiration measured; and the effect of exercise after running up and down four flights of

stairs, was noted. The Romberg test for steadiness was used in some cases.

The best of all indications proved, however, to be the headache induced by carbon monoxide. This is the characteristic oxygen deficiency phenomenon, observed in persons at great altitudes, and induced in nearly all persons by certain degrees of saturation with carbon monoxide, although there are some individual differences in the exact point at which it appears. It is usually of the throbbing frontal type, more rarely occipital. It easily passes into nausea and is accentuated by exertion.

Space forbids a detailed description of theory or experiments, but data were obtained sufficient to prove that the rate at which carbon monoxide is absorbed from air is such that at least an hour is required for the blood to attain a degree of saturation equal to half that which would finally be attained by a stay of indefinite duration.

From these demonstrations the following rule was derived for practical use: When the time is expressed in hours and the saturation in parts per 10,000 there will be no appreciable physiological effect when the product of the time multiplied by the saturation equals 3; when the product of time by concentration equals 6, there will be in some persons slight effect; when it equals 9 there will be in nearly everyone a distinct effect; when it equals 15 the condition is dangerous. An allowable vitiation, not exceeding 4 parts of carbon monoxide in 10,000 of air, is, therefore, recommended as a practical standard for vehicular tunnels.

It is quite certain that this standard is very often exceeded in garages. Severe headaches are extremely common among mechanics, and others, who work around automobiles; so much so that repeated partial asphyxia is a distinct health hazard.

The data given above will serve to indicate the character of the hazard in the small private garage. During the winter months in the northern States asphyxiations in such private garages are unfortunately quite common. The owner starts his car before opening the doors in order to get the engine warm. If the garage is 10 x 10 x 20 ft., giving a capacity of 2,000 cubic feet, and the car produces 1 cubic foot of carbon monoxide per minute, it requires only 1 minute for the vitiation which we have recommended for the tunnel to be reached; and in five minutes the atmosphere contains 20 parts of carbon monoxide in 10,000 of air, an amount sufficient to induce rapid asphyxiation. And, of course, if the car continues to run, the vitiation mounts steadily toward a rapidly-fatal concentration of carbon monoxide.

In addition to our experiments on men, which could not, of course, be pushed beyond the point of severe headache, we have performed an extensive series of experiments on animals, which we carried to the point of extreme, or even fatal, asphyxiation. These experiments were performed with pure CO, with exhaust gas from automobiles, and with illuminating gas. They show that CO is practically the sole toxic constituent in exhaust gas when pure gasoline is burned. Illuminating gas, however, owes, perhaps, 20 to 25 per cent. of its toxicity to some other constituent, perhaps benzol. Gasoline, as sold in some places, is mixed with coal distillate, which contains benzol, and produces a correspondingly more toxic exhaust gas.

Gasoline vapor itself has been found in our experiments to have qualities somewhat like those of ethyl ether.[6] It is an anaesthetic, but the stage of excitement passes through a very narrow region of full anaesthesia into convulsions ended by death. In the toxicity of exhaust gas unburned gasoline is not an appreciable factor. Workmen are, however, sometimes overcome when they go into a large tank in which gasoline has been stored. Benzol is much more toxic, as Dr. Alice Hamilton has recently pointed out.[7]

Finally, these investigations have led on to the study of the treatment of CO poisoning. Obviously the first step in any treatment must be the restoration of spontaneous breathing, if it has stopped. For this purpose the manual prone pressure method of artificial respiration is to be recommended above any apparatus, for it is as effective, or even more effective, than apparatus, and it can be applied instantly, while the bringing and adjustment of apparatus involve delay. A delay of even a couple of minutes may sometimes be fatal.

The next step, after spontaneous breathing, must obviously be to accelerate the elimination of carbon monoxide from the blood. For this purpose the inhalation of oxygen has long been recognized as the specific procedure. But the difficulty arises that after a long exposure to an atmosphere containing carbon monoxide, respiration is very much depressed, and the inhalation of oxygen has no very stimulating effect upon the volume of breathing. It occurred to my associate, Dr. H. W. Haggard, and myself, to utilize the stimulating action of carbon dioxide. In a series of experiments on dogs we found that in animals which were brought almost to the point of death, and then allowed to recover spontaneously in air, the period of elimination of carbon monoxide from the blood covered several hours. When the subjects were made to inhale oxygen the rate of elimination was at first not very much more rapid, the reason being that the oxygen was inadequately inhaled. When, however, a small amount of carbon dioxide was added to the oxygen a very active breathing was induced, by which the lungs were so effectively ventilated, and the oxygen was given so free an op-

portunity to act upon the blood, that after a period of a quarter to half an hour nearly all of the carbon monoxide had been eliminated from the blood.[8]

Recently the American Gas Association, representing practically all of the illuminating gas interests of the country, has requested Dr. C. K. Drinker, of the Harvard Medical School, to organize a commission for the further investigation of the subject of resuscitation from illuminating gas poisoning. The members serving on this commission are, Dr. Drinker, as chairman, Drs. D. L. Edsall, W. B. Cannon, L. J. Henderson, W. K. Lewis, F. W. Peabody, Mr. C. B. Scott of the Bureau of Safety, Dr. R. R. Sayers of the U. S. Bureau of Mines, Drs. Howard W. Haggard and Yandell Henderson. The last two named have been appointed a sub-committee to investigate the efficacy of the above-mentioned treatment. Through the courtesy and coöperation of the Consolidated Gas Co., of New York City, which has placed at our service its emergency wagons, and with the support of Health Commissioner Copeland, and the hospital authorities of New York City, we have been able to give the method an extensive test. The results indicate that a deeply asphyxiated patient, who can be reached within a half-hour—and the utmost speed at this time is essential for success—and who is then given inhalations of oxygen containing 5 per cent. carbon dioxide, can be practically freed from carbon monoxide within 30 to 40 minutes. Frequently also consciousness returns.

The demand for cheaper gas on the part of the public, and the rise in the cost of crude petroleum, the introduction of the mantle burner, the increased use of gas for cooking and heating purposes, have inevitably resulted in an increased number of fatalities from illuminating gas asphyxiation. For those cases which can be reached in time the treatment above indicated will, it is our belief, not only increase the chances of survival, but also the probability of complete recovery and freedom from the distressing sequelae sometimes associated with poisoning by illuminating gas, or the exhaust gas of automobiles.

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RUPTURE OF OVARY WITH MASSIVE HEMORRHAGE AS A COMPLICATION OF AN ACUTE APPENDICITIS.

REPORT OF A CASE, WITH REVIEW OF THE LITERATURE.

BY HENRY S. PENN, M.D., LAWRENCE, MASS.

RUPTURE of an ovary with hemorrhage of various degrees may occur entirely independent of ectopic pregnancy. Such accidents are not only possible but are of much more common occurrence than we naturally imagine. The voluminous literature on the subject testifies to that effect. The possibility of serious hemorrhage was pointed out as early as 1851 by Nelaton,[1] Rokitansky[1] in 1855, and Peuch[4] in 1858, the latter calling it "ovarian apoplexy."

In addition, a number of cases were reported by Wilson,[2] who states that "there is a case on record of a woman who died from a shock on the eve of her marriage, as a result of a profuse intraperitoneal hemorrhage from a ruptured corpus luteum"; and similar papers by Hollins, Hind, Penny,[1] Richard R. Smith,[7] and a host of others. Schumann,[3] in his recent review, brings the subject up to date.

The extent of the hemorrhage may naturally vary from a small amount up to a fatal exsanguination, as in the case reported by Peuch, where three pints of blood were lost.

The etiology of a purely ovarian hemorrhage is so far entirely hypothetical.

Jaile[5] claims that rupture of small cysts of the ovary is a frequent cause of blood in the pelvis.

Schambacker[5] found that hemorrhage was often due to rupture of utero-ovarian plexus of veins.

According to Primrose,[1] a sudden strain, a sudden rise in intra-abdominal pressure, especially if this happens a few days before or during the menstrual period, may act as the cause of the accident.

Novack[3] maintains that the original site of Graafian follicle hemorrhage is the perifollicular stroma, and that it only later breaks into the follicle, and "in certain cases . . . the hemorrhage is of the perforative type, the blood breaking through the surface of the ovary, causing an abdominal hemorrhage" (Abstract of discussion, *Journal A. M. A.*, Vol. 77, page 695).

Richard R. Smith[7] thinks that the cases of acute hemorrhage from a ruptured Graafian follicle or corpus luteum should be grouped by themselves, because they are apparently not caused by any pathological condition of the ovary or pelvic organs.

Schumann,[3] on the other hand, points out that when a massive hemorrhage occurs from an ovary there is usually to be found some pathological process of the ovarian blood-ves-

sels present. This deduction is based on a case where the microscopic examination of the ovary did show degenerative fibrous changes of the blood-vessels.

In the author's case the hypotheses of Primrose and Novack seem to be well sustained, and as far as the literature could be traced this is the second case on record where an acute appendicitis was complicated by a ruptured ovary with massive hemorrhage. The first and almost identical case was reported by Primrose.[1]

A preoperative diagnosis of this condition, while theoretically possible, is in reality a very difficult problem, especially in the presence of acute abdominal condition, as this case happens to be. However, two vital points are of practical importance in the diagnosis: First, early recognition of the hemorrhage and immediate operation; and second, to quote Bovee,[4] "that from the personal as well as from the medical legal standpoint, a diagnosis of ectopic pregnancy should not be made in cases in which pregnancy should not exist" (Bovee quoted by Schumann[3]).

CASE HISTORY.

Present Illness.—Woman, age 20, married one month. Has always been well except for an occasional pain in the right side. The present attack began about five hours ago, with severe abdominal pain and persistent vomiting.

Physical Examination.—Pulse, 120. Temperature, 100°. There was marked tenderness and spasm over the right lower quadrant, otherwise negative. White count, 14,000. Vaginal examination disclosed nothing abnormal. A diagnosis of acute appendicitis was made and operation advised, which was refused. About 3 o'clock in the morning, next day, a hurried call was sent and patient was found in bed, pale, weak, with a feeble and thready pulse and in almost complete shock. She complained of a great deal of pain, headache and dizziness. Abdomen was somewhat distended, pain all over, but more so over the right lower quadrant. Temperature, 100°. Pulse, 136-140.

Operation.—Right rectus incision. Free and clotted blood escaped upon opening the peritoneum. Bleeding seemed to come from pelvis. Appendix found markedly injected and kinked. Incision enlarged downward and uterus brought into view. Right ovary found to be the source of hemorrhage. It was normal in size, somewhat twisted on its pedicle, and presented a ruptured Graafian follicle, from which active bleeding took place. Ovary and tube were removed, also the appendix. Abdomen cleansed of blood, which amounted to about 11 to 12 ounces. Small rubber drain inserted and wound closed in the usual manner. Patient made an uneventful recovery.

Conclusion.—Apparently in this case, like in the one reported by Primrose, the hemorrhage was due to the increased intra-abdominal pressure brought about by the persistent vomiting. It is also worth noting that the patient's menstrual period took place a day after the operation.

Pathological Report.—Received ovary, tube and appendix. Tube is slightly thickened, dark red in color, and shows fibrous serosal adhesions. The ovary is pale, normal in size, and shows an area of rupture on surface communicating with small cavities, which can be stretched open to a distance of 1 cm. The appendix measures 7 cm., pale, with fibrous thickened wall and dilatation of the terminal one-half of the lumen.

Microscopic examination of ovary shows luteal tissue and area of hemorrhage; probable source of intraperitoneal hemorrhage. Fallopian tube shows extreme congestion of vessels, with slight infiltration of wall with polymorphonuclear leucocytes. The mucosa shows no pathological change.

Diagnosis.—Corpus luteum and hemorrhagicum. Acute congestion of tube. Chronic fibrous appendicitis. (Pathological Department, Tufts Medical School.)

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POSTERIOR RESECTION OF THE RECTUM AND RECTOSIGMOID (KRASKE OR MODIFIED UNDER REGIONAL ANESTHESIA.

LABAT, G. L. (*Johns Hopkins Hospital Bulletin*, April, 1922), discusses his method of performing the operation for resection of the rectum under local anesthesia, recapitulating as follows:

1. The choice of the method of anesthesia is one of the most interesting problems connected with the surgery of the rectum and rectosigmoid.

2. Most of the postoperative complications may be attributed to inhalation narcosis, especially ether, and

can be avoided or considerably lessened by the use of regional anesthesia.

3. Regional anesthesia does not increase the resistance of the patient, but leaves the vital functions of the body in the same condition.

4. The anesthesia does not prevent pulmonary embolism, but excludes the danger of pulmonary postoperative complications, provided no acute condition exists at the time of the operation.

5. The anesthesia has no ill-effects on the gastrointestinal tract; thus the possibility of paralytic ileus and the tendency toward hemorrhage are reduced.

6. All patients are amenable to the method, but one should be cautioned against borderline cases.

7. Previous conditions, such as chronic lesions of the heart, with or without compensation, high blood pressure, pulmonary tuberculosis, diabetes, at least mild and chronic, easily controlled by dietary measures, and chronic renal conditions do not seem to interfere with the operative prognosis.

8. The use of morphin and scopolamin controls the psychic state of the patient and greatly contributes in establishing favorable conditions during the operation; but the stage of twilight sleep must not be reached.

9. With the abdominal field block procedure, colostomy is performed painlessly, provided the patient is not too obese and the mesocolon is not too short. Exploration is possible in the majority of cases, if gentleness is used.

10. The sacral block, consisting of the caudal or epidural and trans-sacral block, added to the paravertebral block of the last three lumbar nerves on both sides, constitutes the method of choice for the posterior resection of the carcinomatous rectum and rectosigmoid.

11. The administration of the anesthesia is not difficult, but it requires practice and patience, irrespective of the gentleness which must always be used in handling conscious patients.

12. If the anesthetic does not give complete anesthesia throughout the operation, the administration of a first stage ether anesthesia during the deep manipulations constitutes a combined method much safer than general narcosis alone.

[J. B. H.]

Changes in the Morphology and Function of the Bone Marrow After Splenectomy.

Johnstone, Ernest M. (*Archives of Surgery*, July, 1922) presents a profusely illustrated article on this subject and draws the following conclusions:

My conclusions regarding marrow changes after removal of the spleen are based on a series of experimental studies of twenty dogs, forty rabbits, and two goats during a period of approximately two years.

The new method of marrow study which I devised for this series of experiments consists of five essential features: (1) a rib marrow specimen removed before splenectomy is used as a control for a series of subsequent specimens removed at intervals after splenectomy. (2) Series of similar rib marrow specimens from normal nonsplenectomized dogs furnish an additional control for the experiments. (3) Rib marrow specimens removed at frequent intervals after splenectomy give a connected picture of marrow changes. (4) The observations on the marrow are correlated with parallel observations on the blood and on the general condition of the animal. (5) Ether anesthesia and cocain anesthesia are used in separate series of experiments in order to test the influence of the anesthetic on the marrow.

Removal of the spleen of a normal animal is followed by definite hyperplasia and hypertrophy of the marrow. The most constant and the most important change in the marrow is an increased production of red blood cells which is clearly observable, on the average, within four weeks after splenectomy and which gradually increases to the maximum about the end of the twelfth week. This maximum degree of activity persists for about twelve weeks and then gradually subsides. Increased production of the white blood cells is sometimes spectacular; it occurs almost immediately after splenectomy, but it is not only inconstant, but also temporary.

The reaction of the erythrogenesis in the bone marrow clearly is independent of any of the anesthetics used. The series of experiments is too small for conclusive findings with regard to the effect of the anesthetics on leukogenesis.

The marrow reaction which follows splenectomy probably is secondary and compensatory to the anemia which follows removal of the normal spleen, thus representing a physiologic response to a demand for more blood cells. It may have no direct relation to the absence of the spleen. The persistence of this marrow reaction, which far exceeds the duration of postsplenectomy anemia, may likewise be an expression of the law of regeneration in excess.

[E. H. R.]

Value of Blood Pressure in Acute Cerebral Compression.

Malone, J. Y. (*Annals of Surgery*, June, 1922) writes as follows:

Medullary compensation following increased intracranial pressure is a constant phenomenon experimentally when the anesthesia is not deep enough to block the corneal reflex or the reaction of the pupil to light, but is absent when the anesthesia is deep.

The depressor fibres in the vagus inhibit the rise of blood pressure following increased intracranial pressure.

Clinically, blood-pressure compensation following increased intracranial pressure is a valuable criterion of the degree of cerebral compression when the pupils react to light, but is of no service when they do not.

A sluggish or absent reaction of the pupils to light indicates a grave prognosis and no time should be lost in relieving the cerebral compression.

It has been an almost invariable rule, however, on the Neuro-surgical Service not to decompress a patient if the blood-pressure is falling or is below normal. This has been taken as evidence that the last stage of compression has been reached and that the medullary centres are exhausted and can no longer compensate.

[E. H. R.]

Extracranial Aneurism of the Internal Carotid.

Winslow, N. (*Annals of Surgery*, June, 1922) writes as follows:

Aneurism of the cervical portion of the internal carotid artery is not as infrequent as supposed.

Before incising a unilateral lump in the neighborhood of the tonsil, especially if of long standing, look, feel, listen.

Spontaneous cure may occur, but the usual termination in untreated cases is death from rupture into the fauces.

The operation of choice is occlusion of the internal carotid proximal to the sac. If this be impossible then ligation of the common carotid artery, together with a ligation of the external carotid, between its origin and first branch. If the external carotid be tied distal to a branch, that branch must likewise be occluded.

After ligation the prognosis is fair both as regards operative recovery and permanent cure.

Aneurism in other localities is by far more prevalent in the male than in the female; in the internal carotid it occurs in almost an equal ratio in the two

sexes, being slightly more prevalent in the male if all types are considered, but much more frequent in the female in the spontaneuos variety.

[E. H. R.]

THE SERUM TREATMENT OF ANTHRAX SEPTICAEMIA.

SYMMERS, D. (*Annals of Surgery*, June, 1922) writes as follows:

Every anthrax lesion of the skin or elsewhere should be tentatively regarded as attended by generalized infection until the result of the blood culture proves the contrary.

In no circumstances is it justifiable to tamper with the anthrax pustule — incision, excision, cauterization, or similar treatment is dangerous, and may be followed by anthrax septicaemia. The only permissible form of local treatment consists in the injection at the periphery of the pustule of broken doses of anti-anthrax serum at intervals of four to six hours, each injection not to exceed a total of ten or fifteen c. c. Failing this, it is better to cover the lesion with a bit of sterile gauze to collect the secretions, but otherwise to leave it absolutely alone.

The most dependable routine method in the treatment of the anthrax pustule is, first, to isolate it within a barrier of anti-anthrax serum subcutaneously injected every four hours; second, to inject intravenously, at once, a sterilizing dose of one hundred and fifty or two hundred c. c. of serum, and, third, to supplement this by the intravenous injection of forty c. c. every four or eight hours. If the blood culture is negative at the end of twenty-four hours, the intravenous use of serum may be discontinued, the local injections being kept up until the pustule is free from bacilli, or at least until involution forms occur in the stained films. In anthrax septicaemia, the liberal use of anti-anthrax serum intravenously, if commenced in time, is capable in many instances of sterilizing the blood with astonishing rapidity, and, in septicaemic cases, the routine just outlined may be followed until the blood cultures are negative.

[E. H. R.]

ANOTHER CASE OF BULLET WOUND OF THE FEMORAL ARTERY AND VEIN SUCCESSFULLY TREATED BY LIGATION OF THE ARTERY AND VEIN AND EXTIRPATION OF THE INJURED SEGMENT.

LAROQUE, G. P. (*Annals of Surgery*, June, 1922) writes as follows:

When one studies the broad principles involved in the treatment of the immediate and remote effects of injuries of large blood-vessels and the results of isolated and collected cases treated in different ways throughout the world, one can scarcely escape the conviction that for arteriovenous lesions of the external iliac or femoral vessels the proper treatment consists of aseptic excision of the wound and lesion and all that this implies; in other words, ligation of the artery and vein above and below, and extirpation of the involved segment. The large number of cases of arteriovenous fistula on record and the monumental contributions of that great truth finder, W. S. Halstead, leave little room for doubt that this is the proper treatment for arteriovenous wounds of this character and location and for arteriovenous aneurism or fistula.

[E. H. R.]

SPONTANEOUS LATERAL VENTRAL HERNIA.

HOLLOWAY, J. K. (*Annals of Surgery*, June, 1922). The author defines the lesion, reports a case with operation, and gives a brief historical sketch, speaks of the etiology, and the pathological anatomy and diagnosis. He gives a chart showing the results in seventeen cases. This is an obscure condition and the article is timely in pointing out its rather rare occurrence.

[E. H. R.]

SPIRAL FRACTURE OF THE TIBIA AND FIBULA.

CALDWELL, JOHN A. (*Annals of Surgery*, June, 1922) believes that the Parham band is an ideal method by which to hold these difficult fractures. He reports ten cases. His arguments are convincing.

[E. H. R.]

PERITONITIS AS A COMPLICATION OF PROSTATECTOMY.

VANDEN BERG, HENRY J., and BUTLER, W. J. (*Annals of Surgery*, June, 1922) call attention to the rather infrequent occurrence of peritonitis following the supra-pubic operation for prostatectomy, but also emphasize its possibility and report a case.

[E. H. R.]

SCIATIC HERNIA.

SUMMERS, J. E. (*Annals of Surgery*, June, 1922) gives a very good historical though brief review of the literature on this subject and illustrates his article with some very excellent anatomical drawings and photographs of a patient operated on, and reports the operation in detail. The article is of considerable value.

[E. H. R.]

AN IMPROVED METHOD OF SKIN GRAFTING.

PARCE, A. D. (*Annals of Surgery*, June, 1922), after a considerable experience with war injuries, has devised a rather unique method of applying skin grafts. He uses a sterile dental composition as a mould, makes an exactly fitting outline and mould of the area to be grafted, with this pliable material. After it has hardened, he covers the under surface of his mould with an ordinary Tiersch graft, holding it in place by several catgut sutures over the top of the mould. The area to be grafted is properly prepared and the edges of the area slightly undermined so that the material with its flat graft fits snugly, a few interrupted catgut sutures hold the material in place, sufficient pressure is applied for 6 to 10 days to prevent the accumulation of any serum which would tend to raise the graft from its bed.

The article contains several very excellent illustrations of the technic and the results.

[E. H. R.]

FILIARIASIS IN PANAMA.

MCFARLAND (*American Journal of Tropical Medicine*, Vol. No. 3, May, 1922) reports the finding of microfilaria in 34 out of 1124 persons examined. None of the individuals harboring the parasites showed any symptoms or lesions recognized as referable to its presence. About half of the cases were in hospital for other conditions, and the remainder were presumably healthy laborers.

The writer says that the ordinary methods of staining the organism proved unsatisfactory in his hands, but that a saturated *alcoholic* solution of methylene blue gave excellent results. He worked with thick smears laked in tap-water.

[G. C. S.]

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THE RELATION OF FOCAL INFECTIONS TO MENTAL DISEASE.

THE question as to the exact relationship between focal infections and mental disease is one that is attracting considerable attention and discussion at the present time. There are those who feel that focal infection is the long looked for explanation of dementia praecox and manic depressive insanity, and that proper therapy directed against this cause will produce a very high percentage of cures. Perhaps the most vigorous advocate of this view is Dr. Henry A. Cotton, Medical Director of the Trenton State Hospital, New Jersey. According to Cotton,[1] "Psychoses arise from a combination of many factors, some of which may be absent, but the most constant is an intracerebral, bio-chemical, cellular disturbance arising from circulating toxins, originating in chronic focal infections situated anywhere throughout the body and probably to some extent in disturbances of the endocrin system." The principal organisms which produce these focal infections are the streptococcus (both hemolytic and non-hemolytic types, the staphylococcus, and colon bacillus. The primary foci of infection are the teeth, tonsils, gastro-intestinal and genito-urinary tracts. The treatment consists in the operative removal of infected teeth, tonsils, and other organs, in the use of autogenous vaccines and a serum immunized to streptococci and colon bacilli.

Under such a system of therapy, it is stated that, in the last three years, over one thousand patients of the so-called "incurable" group have been discharged and that the discharge rate for the "functional" group has been raised from thirty-seven per cent. to between sixty-five and seventy per cent.

It is unfortunate that but little work has been done to prove or disprove Cotton's results. We must confess with shame that almost none of our State hospitals has the equipment, the physicians or the money to undertake such a piece of work. Perhaps the publicity given the whole subject will result in an aroused public opinion which will demand and secure adequate facilities for our hospitals for mental diseases.

There have, however, been three pieces of work to which it might be well to call attention. The Report of the Research Committee financed by the Michigan State Dental Society[2] maintains that all previous work on bacterial cultures from teeth have necessarily given unreliable reports due to inevitable contamination. Using a perfected technique, it was found that thirty-three per cent. of pulpless teeth in cases of myocarditis, nephritis, arthritis or neuritis gave negative cultures. It was also held that if properly treated, a non-vital tooth may remain uninfected for years.

Kopeloff[3] has made a very careful study of the gastric contents both as to chemical analysis and bacterial content. Briefly, he found that single determinations of gastric acidity by the Rehfuss fractional method are unreliable, that there was no correlation between degree of acidity and number or type of bacteria present, that the swallowed saliva markedly impaired the value of bacterial examinations and that aliquot fractions do not accurately represent the total gastric contents. He concludes that the Rehfuss method is not a valid procedure with which to establish the stomach as a focus of infection and an etiological factor in the functional psychoses.

Cheney[4] carried through two series of cases, one group having all foci of infection removed and the other group having no attention paid to such foci. He was unable to show any marked difference in recovery rate between the two groups.

The relation of the focal infections to mental disease is still unknown. The reports of various workers are conflicting. Perhaps the situation can best be summed up by quoting from Adolph Meyer's foreword in Cotton's "The Defective, Delinquent and Insane." "If these lectures stimulate physicians and laymen to furnish means for extensive, well controlled trials, I shall feel that the somewhat extreme claims which go beyond what I personally believe to be my experience, may find their excuse in good

results. Let the best agencies come together and give the best talent, the best opportunities for work from all sides. Let criticism be constructive and not only restrictive."

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THE SHEPPARD-TOWNER ACT.

THE Children's Bureau has approved the plans of thirty-six states for the administration of this law. Forty-two states have accepted the act. Although up to July 14 the Louisiana Legislature was still in session, no action had been taken in that state. The Louisiana Senate Committee on Health and Quarantine reported unfavorably on the bill to accept the Federal Act. New York and Rhode Island have taken the same attitude as Massachusetts.

H. M. Towner, one of the authors of the original bill, has rendered an opinion on the constitutionality of the act. This seems to be a reply to the opinion given by Attorney-General Allen. Judge Towner argues that the law is constitutional under Article 1, Section 8, of the Federal Constitution, which gives to Congress the power "to lay and collect taxes, duties, imports and excises, to pay debts and provide for the common defense and general welfare of the United States." His reasoning is based on the preamble and on many classic works relating to the Constitution and the interpretations set forth by various speakers and writers in dealing with the provision embodied in the words, "general welfare." It is his opinion that these words justify an existence of the Public Health Service and he claims that if this part of the Constitution cannot be interpreted to make legal provision for the Sheppard-Towner Act, then some other national activities are operating without legal authority.

As types of legislation which may be construed as valuable precedents, he refers to the land grant college appropriations, the Smith-Lever Act of 1914 for instruction in agriculture, the Smith-Hughes Act of 1917 for vocational education, and the Federal grants for highway construction.

It would be futile for an unprofessional critic to attempt to make any logical argument relating to a constitutional question, but a layman may justly feel that in the presence of differences of opinion, expressed by recognized exponents of law, those states which have decided to wait for the opinion of the Supreme Court have adopted the sane course.

There are in operation throughout this country at the present time certain customs which have been adopted for the purpose of meeting the wishes of some people, about which there is the shadow of suspicion that, if the highest courts should be asked for opinions as to the legality of acts adopted by state legislatures authorizing these customs, some enacted laws may be found to be unconstitutional. It should be kept in mind that no law is really established until it has been contested and been passed upon by the Supreme Court. Massachusetts, through her Attorney-General, has assumed leadership in a movement which will determine the standing of the Sheppard-Towner Act. When the decision of the Supreme Court shall have been rendered the whole country will be under obligation to the Bay State. If constitutional, then the way is clear for those states which believe in the policy of Federal bounties to states to be applied under Federal approval, to unite with the government in carrying on state activities.

RESPONSIBILITY FOR THE ENFORCEMENT OF LAW.

IN the July 13, 1922, edition of the JOURNAL an article dealing with the history and psychology of quackery, by Robert W. Lovett, was published. It was a strong presentation of facts and a logical analysis of human weaknesses. The older men in the profession could give testimony confirmatory of the tendencies of many of the people to apply to the ignorant pretender for relief from physical ills. The men who have entered upon the practice of medicine since 1900 can hardly realize the earlier extent of these foolish customs, for the itinerant quack has almost universally gone to his reward, and the number of poorly equipped practitioners has steadily decreased. But even though conditions have improved in some respects we have new problems presented in the development of the cults which call for solution. In all the states efforts are being made to regulate the irregulars and protect the people from inadequate or improper service. These efforts are of two kinds, one designed to provide for better qualified physicians, and the other to inhibit or eliminate the pretender who blatantly advertises his methods as cure-alls.

Laws relating to the control of medical practice have been formulated to meet conditions as they appeared from time to time, and have been productive of good so far as they have been enforced and upheld, but in some instances have been found to be more or less obnoxious because occasionally, in their application, a well intentioned but poorly informed physician has unwittingly been annoyed by the exaction imposed.

It may be necessary to have at some convenient time a survey of the laws enacted by this State for the purpose of ascertaining which ones should be retained and which discarded, for even among intelligent and honorable men there are

differences of opinion. As examples, the law relating to the association of a registered physician with one not entitled to practice, and the status of the unregistered associate with the legally qualified doctor might be discussed. Also, the law relating to the practice of obstetrics. In illustration of the difficulties encountered under the example first mentioned—a practitioner recently sent a medical student to attend a case which he, the registered man, had not seen. The student failed to appreciate the gravity of the case and the family secured the services of another physician who found the patient suffering from a dangerous disease and sent the case into a hospital. Death supervened in a few hours. The circumstances were reported to the police. The doctor who sent the student was disciplined by the Board of Registration in Medicine and complaint against the student made to the prosecuting authorities. There appears to be some evidence tending to show that prominent and influential physicians have felt that the registered physician and the student should have been dealt with more leniently.

This same tendency to interfere in the application of the law has been shown in the testimony submitted by a physician in good standing when several midwives were being prosecuted by the State police. This physician testified, as an expert, that the practice of midwifery is not the practice of medicine, and on the strength of this medical opinion the judge found the defendants not guilty. In a subsequent trial before a jury the same physician repeated his testimony and, although it was shown in the evidence that one of the midwives had advertised as such for many years and at the time of the birth of a child had applied drops to its eyes, some of the jury were so impressed by the physician's opinion that a disagreement resulted.

These alleged facts seem to demand some action by the profession, for it is disconcerting for officers of the law to find that their efforts at enforcement do not meet the approval of physicians. Either these laws should be enforced or they should be stricken from the statutes. Unfortunately, the State cannot appeal from an adverse decision by a judge or a jury, and although the Supreme Court has upheld our medical laws in every instance when appeals have been carried thus far, serious obstacles seem to be encountered in the antagonism of our own members.

We are united in our opposition to the cults; should we not carry reforms within our own ranks so far as the laws may be made effective? Will the State Society act to either change the laws or to exert its influence for enforcement of them?

DENATURED ALCOHOL.

The Internal Revenue Commission has authorized the use of the following formula by visiting nursing associations, public nursing associations, clinics and dispensaries which are of semi-public character and engaged in charitable work:

Ethyl alcohol, one hundred gallons, to which is added twenty-five fluid ounces of phenol U.S.P., four fluid ounces of oil of wintergreen or methyl salicylate U.S.P.

This is a reasonable concession, but alcoholic preparations are still unduly expensive. There should be some way provided by which the legitimate use of alcohol might be secured at true cost. Alcohol is not expensive to manufacture and the price is much more than should be required of hospitals and laboratories devoted to scientific operations which have no commercial purpose.

THE EXAMINATION OF FOOD HANDLERS.

Although the Department of Health of New York City has carried on some work relating to the health of food handlers, it is stated that less than ten per cent. of these people are examined for the purpose of ascertaining whether such persons are suitable ones to be distributing food. Of this small number examined less than one-fourth are examined by physicians employed by the health department. Even with this inadequate investigation seven typhoid carriers have been discovered in the past seven years, or on the average, one a year. If the proportions of typhoid carriers in the other more than 90 per cent. is approximately that found in the examined class, there would be about nine typhoid carriers handling food-stuffs. This may not seem a large number, but as possible foci of infection many cases might result from these sources.

NEWS ITEMS.

Jokichi Takamine.—The death of this eminent chemist occurred in New York, July 22, 1922. Dr. Takamine was born in 1854, and had been living in Passaic, New Jersey, for several years. He is credited with the discovery of adrenalin in 1900, and takadiastase in 1894. His education was secured in Japan and Glasgow. He was chemist to the Japanese Department of Agriculture and Commerce when he achieved distinction. Most of the time since 1890 he had lived in this country and was deeply interested in promoting amicable relations between this country and Japan. He was a member of many scientific and social organizations.

The Public Health Institute of Chicago Finances a Coöperative Research.—The Public Health Institute of Chicago has undertaken

to finance the coöperative research between the University of Wisconsin Medical School and the Chemical Department of Northwestern University, which in the past has been supported by appropriations from the United States Interdepartmental Social Hygiene Board. This research which has been devoted to attempts to improve the treatment of syphilis of the central nervous system has been directed by Dr. W. Lee Lewis and Dr. Frank C. Whitmore of Northwestern University, and Dr. A. S. Loevenhart and Dr. W. F. Lorenz, of the University of Wisconsin. The Public Health Institute has appropriated $21,600 to both universities for the coming year.

THE LAWRENCE MEMORIAL HOSPITAL.—By the bequests of Daniel W. Lawrence, Roswell B. Lawrence, and the gift of a site by Mrs. Carolyn R. Lawrencee, Medford is to be provided with a modern hospital. The contracts have been awarded and the work has been begun. The design is by Charles B. Dunham with Stevens & Lee consulting architects. The general character of the building is of modified Georgian type. The dimensions are 148 by 125 feet, two stories, with a third story over a portion of the center for the operating department. The general scheme provides for such future additions as may be needed for a large city. In addition to the equipment for general medical and surgical services, there will be a maternity department with a children's ward. It is claimed that this is the first hospital in New England which is equipped with rubber tile and ceilings especially treated to absorb noises and insure silence. All the arrangements and equipment are of modern design and when completed this hospital will be a model to be studied.

FEDERAL SOCIAL HYGIENE BOARD.—The interdepartmental Social Hygiene Board has passed out of existence and a bill has been introduced in Congress authorizing the Department of Justice to take over the work formerly conducted by this board. Surgeon-General of the Army M. H. Ireland, Surgeon-General of United States Public Health Service Hugh S. Cummings, and others, recommended this change. It is felt that the Department of Justice, coöperating with State and local health officials, can deal with the questions pertaining to prostitution and venereal diseases.

MEETING OF THE BARNSTABLE DISTRICT MEDICAL SOCIETY.—On August 4, 1922, this society will meet at the Barnstable County Infirmary at Pocassett. This meeting is arranged especially for social as well as professional entertainment, and is called under the title of "Ladies' Day." All physicians, whether members of the society or not, are invited to attend with their wives.

WINTHROP COMMUNITY HOSPITAL.—Mention has been made in the public press of the closing of the Metcalf Hospital in Winthrop. The geographical location of Winthrop seems to demand a local hospital, for the transportation of emergency cases to metropolitan hospitals would entail inconvenience and suffering. The nearest accessible institution is the Chelsea Memorial Hospital, which is often taxed to its capacity. The inability of Dr. Metcalf to carry on his hospital because of impaired health has led prominent citizens and the physicians of Winthrop to inaugurate a campaign for funds by which hospital service can be maintained and extended. The only other place where medical service can be dispensed, aside from that provided by private physicians, is the Health Department Dispensary. An executive committee, consisting of Mr. G. Wallace Tibbetts (chairman), Dr. Frederick G. Dews, Messrs. Preston B. Churchill, Eugene P. Whittier, Charles R. Bennison, Albert S. Smith, William H. Gardner, A. W. Belcher, T. W. Berridge, J. S. Carr, Thos. Davidson, R. A. Lang, A. B. Reade and Israel Sisson have the matter in charge. Dr. Bernard W. Carey is acting in an advisory capacity in addition to the physicians of the city. The drive for funds has taken the form of a stock-selling campaign. About $5,570.00 worth of stock (non-dividend paying) have been sold. There is a possible fund of $20,000 subscribed under a previous drive conducted last spring. The plan is to purchase the Metcalf Hospital and enlarge it to thirty beds' capacity with all necessary equipment. This will be regarded as a temporary plant to be used until a more permanent hospital may be built with the expectation of converting it into money and applying the proceeds to the erection of a modern hospital whenever sufficient funds may be available.

WEEK'S DEATH RATE IN BOSTON.—During the week ending July 22, the number of deaths reported was 174 against 166 last year, with a rate of 11.87. There were 29 deaths under one year of age against 28 last year. The number of cases of principal reportable diseases were: diphtheria, 36; scarlet-fever, 20; measles, 58; whooping-cough, 34; typhoid-fever, 3; tuberculosis, 42. Included in the above were the following cases of non-residents: diphtheria, 1; scarlet-fever, 3; whooping-cough, 1; typhoid-fever, 2; tuberculosis, 3. Total deaths from these diseases were: diphtheria, 1; measles, 2; tuberculosis, 13. Included in the above were the following cases of non-residents: tuberculosis, 2.

DR. GEORGE MONROE PALMER of Lynn died suddenly at Floating Bridge Pond in that city, July 21, 1922, at the age of fifty-nine.

He was born in Rochester, N. H., in 1863, graduated from Harvard Medical School in the

class of 1892, joined the Massachusetts Medical Society in the same year and settled in practice in Boston. His interest was in internal medicine and in chemistry. Following 1908 he lived successively in Cambridge, Watertown and Belmont, moving to Lynn in 1919. Laterly he was employed in the chemical laboratories at the State House. He is survived by a widow and a son.

Miscellany.

LEGISLATIVE MATTER.

MENTAL HYGIENE.

THIS act passed in the later sessions of the Legislature is supplementary to the letter of Dr. L. Vernon Briggs in the issue of July 27:

CHAP. 519.

AN ACT ESTABLISHING THE DIVISION OF MENTAL HYGIENE IN THE DEPARTMENT OF MENTAL DISEASES.

Be it enacted, etc., as follows:

SECTION 1. Chapter nineteen of the General Laws is hereby amended by inserting after section four the following new section:—Section 4A. There shall be in the department a division of mental hygiene, under the supervision of a director. The commissioner, with the approval of the governor and council, may employ such expert assistance to serve in said division as may be necessary.

SECTION 2. Chapter one hundred and twenty-three of the General Laws is hereby amended by inserting after section three the following new section:—Section 3A. The department shall take cognizance of all matters affecting the mental health of the citizens of the commonwealth, and shall make investigations and inquiries relative to all causes and conditions that tend to jeopardize said health, and the causes of mental disease, feeble-mindedness and epilepsy, and the effects of employments, conditions and circumstances on mental health, including the effect thereon of the use of drugs, liquors and stimulants. It shall collect and disseminate such information relating thereto as it considers proper for diffusion among the people, and shall define what physical ailments, habits and conditions surrounding employment are to be deemed dangerous to mental health.

SECTION 3. Said chapter one hundred and twenty-three is hereby further amended by inserting after section thirteen the following new section:—Section 13A. Such of the powers and duties conferred or imposed upon the department, relating to the cause and prevention of mental disease, feeble-mindedness, epilepsy and other conditions of abnormal mentality, as the commissioner may determine may be exercised and performed by the division of mental hygiene. In addition to said powers and duties, said division shall institute inquiries and investigations for the purpose of ascertaining the causes of mental disease, including epilepsy and feeble-mindedness, with a view to its prevention. It may also establish, foster and develop out-patient clinics. (Approved June 8, 1922.

POST-OPERATIVE COMPLICATIONS OF THE RESPIRATORY TRACT.

DR. H. RYERSON DECKER, F.A.C.S., of Pittsburgh, Pa., says in *Current Research in Anesthesia and Analgesia* "that complications of the respiratory tract develop after operation with greater frequency and more serious consequences than most surgeons and anaesthetists appreciate. No clinics and no clinicians are immune, especially if they make careful observations and keep accurate records. Collected figures that are reliable, such as given in Table 1, show that on the average one case in every forty-five operated upon develop a respiratory tract lesion and that one case in every two hundred dies from this complication.

TABLE 1.

	Operations.	Morbidity.	Morbidity Per Cent.	Mortality.	Mortality Per Cent.	Mortality of Morbidity Per Cent.
Cutler & Morton, Mass. Gen'l.	3,490	65	1.8	33	.94	50.7
Armstrong, Montreal Gen'l...	2,500	55	2.2	32	1.28	58.1
Mayo Clinic.....	16,317	220	1.32	15	.11	9.6
Von Lichtenberg.....	23,673	440	1.9	..	..	..
Cutler & Hunt, Peter Brigham	1,562	55	3.52	11	0.7	20
Decker, Pittsburgh, 1920.....	5,976	69	1.2	29	0.5	42
Decker, Pittsburgh, 1921.....	2,125	16	0.7	6	0.3	37.5

"Last year I reviewed a series of 5,976 cases operated upon consecutively in the surgical services at St. Francis Hospital and my own at Presbyterian Hospital, Pittsburgh, in which series the morbidity was 1.2 per cent., and mortality 0.5 per cent., both comparatively low figures, as seen by Table 1. However, one should make due allowance for statistics. In our series we excluded minor cases which had no anaesthetic or remained in the hospital less than two days, cases of primary surgical respiratory tract disease, *e.g.*, suppurative pleurisy, in which respiratory tract complications are to be expected, cystoscopic examinations, and finally nose and throat cases, *e.g.*, tonsillectomies for which the patients remain in the hospital so short a time, that records of the post-operative course are not available. Nor in our report did we take cognizance of the milder respiratory tract complications, such as coryza, pharyngitis, and tonsillitis, inasmuch as they involved no serious consequence to the patient, and, furthermore, were incompletely recorded.

"In the last sixteen months, from January 1,

1920, to May, 1921, we have extended our observations, and now report a review of 2,125 cases from the same sources as in our previous study (the surgical services of R. T. Miller, Mercy Hospital, R. R. Huggins, B. Z. Cashman, W. O. Sherman, and E. W. Meredith at St. Francis Hospital, and my own at the Presbyterian), and with an even lower morbidity and mortality of 0.7 per cent. and .03 per cent. respectively, as seen by Table 1.

The morbidity by disease is shown in

TABLE 2.

	1920	1921
Lobar Pneumonia	45	8
Broncho-Pneumonia	7	6
Bronchitis	7	2
Pleurisy:		
Dry	7	1
Sero-fibrinous	2	..
Empyema	1	..
Pulmonary Embolism	2	..
Pulmonary Abscess	0	1
	71	18
No. of Patients	69	16

"The series shows the usual preponderance of pneumonia, this time nearly equally distributed between the lobar and lobular types. This corresponds more nearly to the findings in other clinics although Cutler, in 1600 cases at the Peter Bent Brigham Hospital this last year, has found only one case which he has called lobar pneumonia.

"It is beyond the limits of this paper to enter into a full discussion of the clinical course of the post-operative respiratory tract complications, so we shall present only a brief summary of some of the important features as we have observed them, in order that we may more fully consider what to us is of more practical import, their etiology and treatment.

"Pneumonia is by far the most frequent and serious complication, in our series, being responsible for 75 per cent. of complications and 90 per cent. of the mortality. Autopsy reports are scarce, but those published show that there may be every known type of pathology, including lobar, lobular (broncho), embolic (infarction), gangrenous, hypostatic, and, lastly, a type important and frequent, which corresponds to a type of non-surgical pneumonia called by the French School, *maladie de Woillez*, and indeed resembles closely, as we have seen it, the gross appearance of *influenzal pneumonia.*"

The writer then proceeds to give the clinical and pathological features of each complication.

This is an important summary of the dangers of anaesthesia and to the occasional etherizer is of especial value in so far as it may lead to recognition of well known dangers which may not have been observed by a recent graduate who under force of circumstance may be called upon to administer anaesthetics. Since these accidents occur in the cases cared for by trained men the facts should be made known to friends of patients.

APPROPRIATIONS FOR PUBLIC HEALTH WORK.

AMONG the appropriations made during this session of Congress the following items appear:

Navy Appropriations.—Care of lepers, Navy Station, Island of Guam, $18,000; for necessaries, Medical Department, $2,400,000; contingencies, Bureau of Medicine and Surgery, $435,000; bringing remains of sailors and marines from France, $65,000; care of naval hospital patients, $85,000; complete construction naval hospital, San Diego, Calif., $500,000.

Army Appropriations.—Water and sewers at military posts, $2,000,000; Letterman Hospital, California, $55,000; claims officers, nurses and enlisted men for pay and allowances during World War, $500,000; construction and repair of hospitals, $529,360; maintenance of quarters for hospital stewards, $10,000; medical and hospital department of army, $1,000,000; hospital care, Canal Zone garrisons, $40,000; Army Medical Museum, $7,500; library, surgeon-general's office, $12,000; office of surgeon-general, $223,280; artificial limbs, trusses, etc., $36,750.

Department of State Appropriations.—Annual share of United States in maintenance of International Sanitary Bureau, $11,323.16; annual quota of United States in support of the International Office of Public Health, $3,860; annual contribution for support of Somerset Hospital at Cape Town, Africa, $50.

Department of Justice Appropriations.—Enforcement of national prohibition act, $250,000; hospital supplies, medicines at various federal prisons, about $15,000.

Treasury Department Appropriations.—For expenses to enforce national prohibition and narcotic acts, $9,250,000; pay and other expenses, Public Health Service, $2,196,530; maintenance of Hygienic Laboratory, $45,000; medical examination of aliens, $5,627,394; quarantine service, $739,000; prevention of epidemics, $400,000; field investigation of diseases, $300,000; Interstate Quarantine Service, $25,000; rural sanitation, $50,000; biologic products and viruses, toxins, etc., $50,000; maintenance of Venereal Disease Division, $400,000, of which sum $225,000 shall be allotted to states for cooperative work; repair of Public Health Service hospitals: Oteen, N. C., No. 60, $100,000; Perryville, Md., No. 42, $150,000; West Roxbury, Mass., No. 44, $50,000; Palo Alto, Calif., No. 24, $50,000.

Independent Bureaus Appropriations.—Medical and Hospital Services, $64,658,680; Vocational Rehabilitation, $146,409,188.80.

Interior Department Appropriations.—Sup-

pressing liquor traffic among Indians, $30,000; relieving and preventing disease among Indians, $370,000; investigation of school hygiene, etc., $50,000; medical relief in Alaska for Eskimos, $90,000; investigations of safety of miners, $378,000; operation and purchase of mine rescue cars, $285,000; operation of St. Elizabeth's Hospital for Insane $1,000,000, repair to buildings $100,000, erection of additional buildings, $128,500; Columbia Institution for Deaf, $95,000; Freedmen's Hospital, $118,555.

Labor Department Appropriations. — Children's Bureau, $106,040; investigation of child welfare, $120,000; Maternity and Infancy Act, $1,240,000.

Agricultural Department Appropriations.— Tuberculosis in animals, $2,877,600; inspection of meat, $981,180; prevention of sale of adulterated foods, $671,401; enforcement of Insecticide Act, $156,510; dehydration of foods, $20,500.

Deficiencies.—Continuing construction of Gallinger Municipal Hospital, District of Columbia, $150,000; United States Veterans Bureau, additional for vocational rehabilitation, $40,000,000; medical and hospital services, $25,000,000; investigation of women in industry, $1,800; Public Health Service, Interstate Quarantine Service, $466; medical and hospital service for disabled war veterans, $87,776.81; medical, surgical and hospital services, $130,000; Quarantine Service, $389,000; prevention of epidemics (emergency), $1,000; support of National Home of Disabled Volunteer Soldiers, $514,700; medical charities, District of Columbia, $23,170.45; support of indigent insane at St. Elizabeth's Hospital, $148,000; Employees' Compensation Commission, $600,000; United States Veterans Bureau, vocational rehabilitation $73,714,182, medical and hospital services $20,287,930; administration of Warehouse Act, $9,015; care of insane in territory of Alaska, $8,800; Children's Bureau for maternity and infancy welfare, $490,000, to be apportioned among the various states; alterations and repairs to Fort Mackenzie, Wyoming, hospital, $100,000; for additional land to Walter Reed General Hospital, $94,703.44; United States Veterans Bureau, authorizes transfer of appropriations from Veterans Bureau to United States Public Health Service; United States Public Health Service authorized to use appropriations already made for operation of immigration hospital at Ellis Island; adjustment of Walter Reed General Hospital land purchases, $44,109.22.

AMERICAN RELIEF ADMINISTRATION.

A CONSTANT stream of serums and vaccines to fight the epidemic diseases which are raging in Russia, particularly in the famine sections and to those centers of population to which the famine refugees have fled, is flowing from the great laboratories of Paris to Moscow and thence into each plague-stricken town and village. Every courier of the American Relief Administration arriving in Russia brings fresh consignments of the life-saving drugs. The Medical Division of the A. R. A. is bending every effort to carry out its prophylactic program, which involves among other items the inoculation of every child receiving its rations and of every adult who receives the American gift of corn, and to all others who may apply for it.

The inoculation is proceeding rapidly throughout the 16 districts where the American medical supervisors are coöperating closely with all the health organizations of the Soviet hospitals and all of the health agencies of the Soviet government.

Every American Relief Administration feeding station, every school where feeding is carried on, every orphanage that draws American Relief Administration rations is a clinic for the administration of the preventive remedies which will help to stop the spread of the contagion.

Not only serums and vaccines are distributed, but the hypodermic syringes, the needles and the sterilizing materials needed for their administration. The activities of the Medical Division, which was at first only a small part of the American Relief Administration's program, are rapidly becoming one of its outstanding features. The scale upon which the inoculation against disease is being carried on is a stupendous one.

Vaccination against smallpox has been a general practice for years in many countries, but this is the first time in history that an attempt has been made to protect upon so extensive a scale the inhabitants of a country against cholera, typhoid, para-typhoid "a", para-typhoid "b", and smallpox at one and the same time.

Each patient with his first inoculation of the tetra vaccine which gives immunity to the first four diseases named above, also receives the ordinary smallpox vaccination, unless he can show evidence of a previous vaccination. Eight million cubic centimetres of the tetra vaccine have already been ordered and 3,500,000 doses of smallpox vaccine.

In addition to the tetra vaccine already mentioned, 300,000 cubic centimeters of triple vaccine and a million of cholera vaccine have been provided, not to speak of the anti-toxins which run into huge figures. For example, of the diphtheria anti-toxin 91,000,000 units is the provision. Six million units of tetanus anti-toxin, 200,000 of antimeningococcic serum and a like quantity of polyvalent anti-dysenteric are other items on the list.

RÉSUMÉ OF COMMUNICABLE DISEASES, JUNE, 1922.

GENERAL PREVALENCE.

THERE were 6,846 cases of communicable diseases reported for this month as against 8,793 for May.

Chicken-pox.—There were 325 cases reported for this month.

Diphtheria decreased from 558 cases for May to 459 cases for June.

Dog-bite requiring anti-rabic treatment was reported in 29 instances. This is a larger number than was ever before reported.

Encephalitis lethargica was reported in 5 instances.

Epidemic cerebrospinal meningitis was reported in 13 instances.

German measles decreased from 96 cases for May to 52 cases for June.

Gonorrhea and Syphilis.—There were 381 cases of gonorrhea and 126 cases of syphilis reported.

Influenza was reported in about the usual numbers. There were 11 cases for June, 1922, and 12 cases for June, 1921.

Measles has begun its annual decline. There were 3,198 cases reported for this month and 4,159 for last month.

Mumps decreased from 514 cases for May to 375 for this month.

Pneumonia, Lobar.—There were 139 cases reported for this month.

Scarlet fever decreased from 755 cases for last month to 470 for this month.

Tuberculosis, Pulmonary.—There were 614 cases reported for this month.

Tuberculosis, other forms, was reported in 130 instances. There were 105 cases reported for last month. In both months the incidence was unusually high.

Typhoid Fever.—There were 41 cases reported for the month.

Whooping cough decreased from 415 cases for May to 359 for this month.

RARE DISEASES.

Anterior poliomyelitis was reported from Lawrence, 1; Lowell, 1; Somerville, 2; total, 4.

Dog-bite requiring anti-rabic treatment was reported from Brookline, 3; Cambridge, 1; Holyoke, 2; Lowell, 17; Newton, 1; Plymouth, 1; Swampscott, 2; Winthrop, 2; total, 29.

Encephalitis lethargica was reported from Boston, 3; Cambridge, 1; Taunton, 1; total, 5.

Epidemic cerebrospinal meningitis was reported from Boston, 4; Concord, 1; Hingham, 1; Lawrence, 1; Lowell, 2; Lynn, 1; Northampton, 1; Peabody, 1; Wrentham, 1; total, 13.

Malaria was reported from Boston, 3; Everett, 1; Holyoke, 1; total, 5.

Septic sore throat was reported from Amherst, 1; Boston, 1; Fall River, 1; Somerville, 2; total, 5.

Smallpox was reported from Milford, 1.

Trachoma was reported from Boston, 4; Cambridge, 1; Lynn, 1; Medway, 1; New Bedford, 1; Somerville, 1; total, 9.

Trichinosis was reported from Holyoke, 1.

CHILD LABOR.

A SENSE of local responsibility for the welfare of the children is what is needed to abolish child labor, declared Herbert Hoover before the National Conference of Social Work in Providence, June 27. Failing in this, an amendment to the Federal Constitution must be sought as the only other alternative to overcome what he considers "a blight that in its measure is more deplorable than war." Forward looking states have passed statutes which fully protect the child in its minority, but there is still a minority of states which are "still in the Middle Ages in their attitude toward childhood." The sense of local responsibility is the only saving grace in this matter, and nothing can be more disheartening than the impulse given to centralization under Federal control by the continuous failure of local government in a matter affecting the nation as a whole so vitally as does the question of child labor. An industry that cannot exist without cheap child labor has no right to exist. A nation that continuously exploits its children is foreordained to fail.—*The Nation's Health.*

CHICAGO'S RAT PROBLEM.

THE business men of Chicago have secured the services of an expert in rat extermination work in order to reduce the danger and financial loss incident to the presence of rats.

The health commissioner has endorsed this movement and promised coöperation. Federal authorities claim that there are as many rats as human beings in this country.

Correspondence.

DIGITALIS IN CARDIAC DISEASE.

NEW YORK, July 19, 1922.

Mr. Editor:

In reading the able and instructive article in your issue of July 13 of Dr. Henry A. Christian, I find the following on page 53: "I know of no cardiac case in which it is necessary to substitute any other drug for digitalis." This statement is far too sweeping and to my mind will occasion, not infrequently, loss of life, if followed, and also be the cause of protracted disease which might be treated successfully with at least one other drug, and that is strophanthus. I have saved lives with tincture of strophanthus in hypodermic tablet form, used sublingually, when I am confident digitalis would have been useless. I have helped restore to strength weak, irregular, fluttering hearts, when digitalis made symptoms worse. For detailed information about "sublingual medication," I refer to my article in *Medical Record,* Dec. 29, 1917.

BEVERLEY ROBINSON, M.D.